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# THE PRACTITIONER

THE

# PRACTITIONER

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W. CECIL BOSANQUET, M.D.

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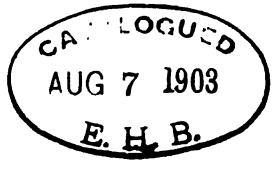


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# GENERAL INDEX

## TO VOLUME LXX.

### A.


PAGE

Abscess, Cerebral, Clinical manifestations of - - - - - 820
Acroparæsthesia, Vascular and toxic - - - - - - 756
Address on Tuberculosis at Glasgow - - - - - - 145
Adenoids, from the practitioner's point of view - - - - 469
Air-passages, Diseases of upper - - - - - - 101
Alcohol once more - - - - - - - - 419
Alcoholism, Cerebral changes in - - - - - - 369
——, Drug specifics for - - - - - - - 420
——, Prospects of cure in - - - - - - - 421
——, Two books on - - - - - - - - 865
——, Work as cure for - - - - - - - - 423
ALLBUTT, T. CLIFFORD: Address on tuberculosis - - - - 145
Aneurysm, Gelatine treatment of - - - - - - 424
—— of the aorta and its symptoms - - - - - 283
Animal parasites and eosinophilia - - - - - - 282
—— remedies in Korea - - - - - - - 130
Aphasia, Puerperal - - - - - - - - 397
Appendix, Primary sarcoma of - - - - - - - 515
Archives of neurology - - - - - - - - 862
ARMOUR, DONALD J.: Surgery of the nervous system - - - 528
Arthritis, Pneumococcic - - - - - - - - 510
Aspirin in diseases of children - - - - - - - 141
Association of Midland Railway Surgeons - - - - - 139
Ateleiosis: A form of Dwarfism - - - - - - 797


### B.


BARNARD, HAROLD L.: Four cases of trigger-finger - - - - 178
BICKERTON, T. A.: Colour-blindness in the Mercantile Marine - - 203
Bicornuate uterus, Rupture of - - - - - - - 82
Blood, Examination of - - - - - - - - 281, 302
BOOKS IN BRIEF: *Practical Hints for Travellers in the near East* (Reynolds-Ball); *A Handbook of Climatology* (Hann: tr. by Ward); *Where shall I send my Patient? A Handbook of Open-Air Treatment and Life in an Open-Air Sanatorium* (Reinhardt and Thomson); *Preparations for Operations in Private Houses* (Wallace); *Disinfectants and Antiseptics* (Wilson); *Simple Rules for Preventing Infantile Complaints and Deaths among Infants* (Nash); *The Four Epochs of a Woman's Life* (Galbraith) - 858
BOYD, STANLEY: Cancer of the Tongue - - - - - - 626
Brain, After-effects of injury to - - - - - - - 389
—— in relation to viscera - - - - - - - - 386
BULLMORE, H. H.: Adhesive mediastino-pericarditis - - - - 212
BURNET, JAMES: Cerebral abscess - - - - - - 820
BUTLIN, HENRY T.: Diagnosis of Cancer of the Tongue - - - 595


### C.


Cancer, Distribution of - - - - - - - - 697
—— in Ireland - - - - - - - - - 727
—— of the lips - - - - - - - - - 577
—— —— Mouth, Insidiousness of - - - - - - 667

PAGE

Cancer of the Tongue, Difficulties in diagnosis of - - - - 595
—— —— ——, Series of cases of - - - - - 626
—— —— ——, Operation for - - - - - - 726
——, Theories of - - - - - - - - 721
Cancer-houses and local infection - - - - - 725
Carcinoma of the Tongue, Lessons from 50 cases of operation for - - 604
CARLESS, ALBERT. Surgical affections of joints - - - - 85
——, ——: Transhyoid pharyngotomy - - - - - 661
Case of gastric dilatation and Tetany - - - - - - 44
—— —— severe pneumococcic invasion - - - - - 510
Case with Comments: Spontaneous rupture of bicornuate uterus during pregnancy, 82; Adhesive mediastino-pericarditis, 212; Primary sarcoma of appendix vermiformis - - - - - - - 515
Cases of difficulty in diagnosis of Cancer of the Tongue - - - 595
Castor oil, How to take - - - - - - - 142
Cave-dwellers, Modern - - - - - - - 132
Cerebral abscess - - - - - - - - 820
—— and mental diseases in relation to medicine - - - - 385
Cerebro-spinal meningitis, Epidemic of - - - - - 338
Chlorosis, salicylate of quinine in - - - - - - 9
CLARKE, J. JACKSON: Lorenz's operation - - - - - 321
Clinical manifestations of Cerebral abscess - - - - - 820
COLBECK, E. H.: Tidal percussion - - - - - - 362
Cod-liver-oil famine - - - - - - - - 861
College life - - - - - - - - - 134
COLLINS, E. TREACHER: Recent work on Ophthalmology - - - 234
Colour-blindness in the Mercantile Marine - - - - - 203
Compulsory detention of alcoholics - - - - - - 423
CONDER, A. F. R.: Adhesive mediastino-pericarditis - - - 212
Cornea, diseases of, in children - - - - - - 16
Cremation in England, History of - - - - - - 112

## D.

DALTON, F. J. A.: Undulant fever - - - - - - 451
DANIEL, P. L.: Adenoids from the practitioner's point of view - - 469
Death-rates of working class communities - - - - - 840
Diabetes and Tape-worms - - - - - - - 131
—— and the Pancreas - - - - - - - - 132
Diabetic psychoses - - - - - - - - 387
Diagnosis of cancer of the tongue, Difficult cases of - - - - 595
—— croupous and catarrhal pneumonia - - - - - 490
—— epithelioma of the mouth from syphilis - - - - 654
Diarrhœa with green stools, Treatment of - - - - - 144
DICKSON, W. E. CARNEGIE: Gastric dilatation and Tetany - - - 44
Dietetics: a review - - - - - - - - 262
Diseases of the Cornea in children - - - - - - 16
—— upper air-passages - - - - - - - 101
Differential diagnosis of cropous and catarrhal pneumonia - - - 490
Diphtheria, Salicylate of quinine in - - - - - - 8
Distribution of cancer, Further contribution to the - - - - 697
DONALD, A.: Rupture of bicornuate uterus - - - - - 82
DORE, S. ERNEST: Light-treatment in diseases of the skin - - - 433
Dysmenorrhœa - - - - - - - - - - 575

## E.

Ear-ache, Treatment of - - - - - - - 140
Early stages of insanity, Treatment of - - - - - 863
Eclampsia, Ætiology and treatment of - - - - - 217
—— collective investigation of - - - - - - 570

PAGE

EDWARDES, EDWARD J., The Imperial Vaccination League - - - 406
Enteric fever, Blood in - - - - - - - - 282
—— Salicylate of quinine in. (*See also* Typhoid fever) - - - 8
Enuresis in children - - - - - - - - 287
Eosinophilia and animal parasites - - - - - - - 282
Epidemic of cerebro-spinal meningitis - - - - - 398
Epithelioma of mouth, Diagnosis of - - - - - - 654
Erysipelas, Salicylate of quinine in - - - - - - - 9
EVE, FREDERICK: Lecture on Melanoma - - - - - 155
Everyday ailments and their treatment, 436: indigestion, symptomatic treatment of phthisis - - - - - - - - 426
Examination of the blood - - - - - - - - 302
Excision of the tongue for cancer - - - - - - - 585
Eye. *See* Ophthalmology.
Eye-strain as a thorn in the flesh - - - - - - - 569

## F.

FOTHERGILL, W. E.: Ætiology of Eclampsia - - - - 217
Four cases of snap- or trigger-finger - - - - - - 178
Fractures of lower extremity, Mode of production of - - - 189
FRENCH, HERBERT: Examination of the blood - - - - 302
FREYER, P. J.: Extirpation of the Prostate - - - - - 744
FRIPP, A. D.: Sarcoma of the tongue - - - - - - - 673

## G.

Gastric tetany, case of - - - - - - - - - 44
——, note on - - - - - - - - - 354
—— ulcer, surgery of - - - - - - - - 277, 567
Genito-urinary surgery, Review of - - - - - - - 826
GIBSON, G. A.: Adhesive mediastino-pericarditis - - - - 212
GILFORD, HASTINGS: Ateleiosis, A form of dwarfism - - - 797
Glossitis, Pneumococcic - - - - - - - - 510
Gynæcology, Review of recent work on - - - - - - 517

## H.

Haab's magnet - - - - - - - - - - 243
Hæmatatomata, Treatment with olive oil - - - - - 216
Health-aspects of London locomotion - - - - - - 247
Herpes Zoster, salicylate of quinine in - - - - - - 10
High-frequency electricity, Use and abuse of - - - - - 357
HILLIER, ALFRED: Tuberculosis and the medical profession - - 788
Hip, Dislocation of, Lorenz's method of treating - - - - 321
Hippocrates - - - - - - - - - 255
HOGARTH, WHEWELL: Acute Pancreatitis - - - - - 504
HUTCHINSON, JONATHAN, jun.: Diagnosis of Epithelioma of mouth - - 654

## I.

Imperial Vaccination League - - - - - - - 406
Indigestion, Treatment of - - - - - - - 426
Indirect violence, Fractures due to - - - - - - - 189
Inebriates Acts - - - - - - - - - 419
——, Compulsory detention of - - - - - - - - 423
Inflammatory and other neoplasms of the jaws dependent on teeth - - 688
Influenza, Salicylate of quinine in - - - - - - - 8

PAGE

Insanity, Study of incipient - - - - - - - 385
——, Treatment of early stages of - - - - - - 863
Insidiousness of cancer of the mouth - - - - - - 667

J.

Jacobson, W. H. A.: Carcinoma of the Tongue - - - 604, 729
Jaws, neoplasms of, dependent on teeth - - - - - 688
Joints, Surgical affections of - - - - - - - 85
Jones, H. Lewis: High-frequency electricity - - - - 357

L.

Laboratory, London County Asylums - - - - - - 864
Lane, W. Arbuthnot: Fractures of lower extremity - - - 289
Langwill, Hamilton Graham: Gastric dilatation and Tetany - - 24
Lead-poisoning from drinking water - - - - - - 566
Lecture on Melanoma - - - - - - - 165
Lessons from 50 cases of operation for Carcinoma of the Tongue - 604, 729
Leucin as a bulky urinary sediment - - - - - - 155
Licence to practise - - - - - - - 134
Light-treatment in diseases of the skin - - - - - 433
Lips, Cancer of the - - - - - - - - 577
Liver, Diseases of the - - - - - - - - 368
Locomotion, London, Health aspects of - - - - 247, 424
Lorenz's method of treating congenital dislocation of the hip - 321, 568
Lupus erythematodes - - - - - - - - 142

M.

Magnet for removing foreign bodies from the eye - - - - 243
Marshall C. Devereux: Diseases of the Cornea in children - - 16
Measles, Prevention of - - - - - - - - 9
——, Salicylate of quinine in - - - - - - - 398
Mediastino-pericarditis, Adhesive - - - - - - 212
Melanoma, Lecture on - - - - - - - - 165
Mental faculties, Localisation of - - - - - - 392
Micrococcus Melitensis - - - - - - - 452
—— of acute rheumatism - - - - - - - 185
—— rheumaticus - - - - - - - - 191
Mimicry of gastric troubles by spinal disease - - - - - 1
Mode of production of fractures of lower extremity - - - - 289
Moore, Sir John: Salicylate of quinine - - - - - 6
Morphine-habit, Treatment of - - - - - - - 285
Morris, Malcolm: Light-treatment of diseases of the skin - - 433
Mouth, Epithelioma of, diagnosis from syphilitic and other lesions - - 654
Moynihan, B. G. A.: Acute pancreatitis - - - - - 504
—— Note on gastric tetany - - - - - - - 354

N.

Nervous system, Surgery of the - - - - - - 528
Newman, George: Prevention of Measles - - - - - 398
—— —— Voluntary agencies and sanitary authorities - - - 115
Nose, sunken, treated by paraffin-injection - - - - - 196
Note on gastric tetany - - - - - - - - 354
—— on salicylate of quinine - - - - - - - 6
Notes by the Way - - - - 130, 276, 419, 565, 721, 861
—— on urinary chemistry - - - - - - - 155
—— Practical - - - - - - - 140, 285, 574
—— upon sarcoma of the tongue - - - - - - 673

PAGE

NOTICES: *Association of Midland Railway Surgeons*, 139; *Eleventh International Congress of Hygiene and Demography*, 573; *The Sanitary Institute Exhibition*, 573.

NOVELTIES AND NOTICES: *Elixir Glycerophosphates (Calcium and Sodium)*, 136; *Cascara Evacuant*, 136; *Adrenalin Chloride*, 136; *Friedrichshall Water*, 137; *All-Glass Aseptic Hypodermic Syringe*, 137; *Puralis Water*, 138; *Milk of Magnesia*, 138; *Pure Concentrated Cocoa*, 138; *Malted Cocoa*, 139; *Liquor Colchicinæ Salicylatis*, 571; *"Lofotol" Cod-liver Oil*, 571; *"Kepler" Malt Extract*, 572; *"Throgmorton" Scotch Whisky*, 572; *Cadbury's Milk Chocolate*, 572; *Dr. Muthu's Inhaler*, 573; *Glycoheroin*, 867; *Valentine's Meat-juice*, 867; *Joyes' Special Fluid*, 867; *Hazeline*, 868; *Marmite*, 868.

## O.

Object of research, True - - - - - - - 284
Ophthalmology, Recent work on - - - - - - 234

## P.

PAGET, STEPHEN: Paraffin-injection for sunken nose - - - 195
Pancreatitis, Case of acute - - - - - - - 504
Paraffin-injection for sunken nose - - - - - - 195
PARKES, LOUIS C.: Infectivity of scarlet fever - - - - 552
—— ——, London locomotion - - - - - - - 247
—— ——, Death-rates of working class communities - - - 840
PEARSON, S. VERE: Croupous and catarrhal pneumonia - - - 490
Percussion in diagnosis of pulmonary tuberculosis - - - - 11
——, Phenomena of tidal - - - - - - - 362
PATERSON, PETER: Sarcoma of the appendix - - - - 515
Pharyngotomy, Transhyoid, - - - - - - - 661
Phenomena of tidal percussion at the apices of the lungs - - - 362
PHILIP, R. W.: Percussion in diagnosis of pulmonary tuberculosis - 11
PHILLIPS, JOHN: Recent gynæcology - - - - - - 517
Pneumococcic invasion, Case of severe - - - - - 510
Pneumonia, croupous and catarrhal, Diagnosis of - - - - 490
——, Salicylate of quinine in - - - - - - - 8
Points of interest in clinical manifestations of cerebral abscess - - 820
POWER, D'ARCY: Distribution of cancer - - - - - 697
Practical Notes - - - - - - - 140, 285, 594
Precancerous conditions - - - - - - 604, 723
Prostate, Total extirpation of, for enlargement - - - - 744
Pruritus vulvæ, Treatment of - - - - - - - 143
—— with jaundice - - - - - - - - 141
Psychoses, diabetic - - - - - - - - - 387
——, typhoid - - - - - - - - - 394
Public Health: Short history of cremation in England, 112; Voluntary agencies and sanitary authorities, 115; London locomotion, 247; Prevention of measles, 398; Imperial Vaccination League, 406; Infectivity of scarlet fever - - - - - - - - 552
Puerperal aphasia - - - - - - - - 397
Pulmonary tuberculosis, Percussion in diagnosis of - - - - 11
Pure lymph for all - - - - - - - - 276

## R.

RAW, NATHAN: Severe pneumococcic infection - - - - 510
Reaction between urea and formaldehyde - - - - - 160
Recent work on ætiology of Eclampsia - - - - - 217
—— —— —— cerebral and mental diseases - - - - - 385
—— —— —— diseases of Liver - - - - - 368
—— —— —— —— —— upper air-passages - - - - 101
—— —— —— Gynæcology - - - - - - - 517
—— —— —— Ophthalmology - - - - - - - 234

PAGE

Recent work on surgery of joints - - - - - - 85
—— —— —— —— —— —— nervous system - - - - - 528
—— —— —— surgical treatment of nephritis - - - 826
Relationship of voluntary agencies and sanitary authorities - - - 115
Research, True object of - - - - - - - - 284
Retreats for inebriates - - - - - - - - 419
Reviews of Books: *A Text-book of Pharmacology and Therapeutics* (Hale White), 123; *Pharmacopedia* (White and Humphry), 125; *International Clinics*, vols. i. and ii., 126; *Transactions of the Clinical Society of London*, vol. xxxv., 127; *Medical Ethics* (Saundby), 127; *Anæsthetics* (Blumfeld), 128; *Vari Metodi Anestesici* (Palleroni), 128; *Histology and Pathology* (Nichols and Vale), 129; *A Manual of Determinative Bacteriology* (Chester), 129; *Practical Dietetics* (Thompson), 262; *The Theory and Practice of Infant Feeding* (Chapin), 262; *A Treatise on Orthopædic Surgery* (Whitman), 266; *Cancer of the Uterus* (Lewers), 267; *Abdominal Manipulation in Pregnancy* (Cameron), 270; *The Evolution of Artificial Mineral Waters* (Kirkby), 271; *Official Year-book of Scientific and Learned Societies*, 271; *A Manual of Bacteriology* (Williams), 272; *Handbook of Bacteriological Diagnosis* (Emery), 272; *A Text-book of Medicine* (Fagge and Pye Smith), 272; *Clinical Hæmatology* (Da Costa), 274; *Cancer and other Tumours of the Stomach* (Fenwick), 274; *A Text-book of the Science and Art of Obstetrics* (Garrigues), 415; *The Journal of Obstetrics and Gynæcology*, vol. i., 416; *The Thompson Yates Laboratory Report*, vol. iv., 417; *Reports of the Society for the Study of Disease in Children*, 418; *A Manual of Medical Treatment* (Burney Yeo), 559; *Transactions of the Association of American Physicians*, vol. xvii., 562; *Guy's Hospital Reports*, vol. lvii., 562; *Selected Essays and Monographs* (New Sydenham Soc.), 563; *The Force of Mind, or the Mental Factor in Medicine* (Schofield), 563; *A Text-book of Diseases of the Ear* (Politzer), 715; *The Diseases of Hot Climates* (Scheube), 716; *Transactions of the Society of Anæsthetists*, vol. v., 717; *Points of Practical Interest in Gynæcology* (Macnaughton Jones), 717; *A Treatise on Pharmacy for Students and Practitioners* (Caspari), 719; *Archives of Neurology* (F. W. Mott), 846; *Practical Handbook of the Pathology of the Skin* (MacLeod), 848; *Diseases of the Skin*; (Morris), 849; *The Principles of Bacteriology* (Abbot), 850; *A Manual of Bacteriology* (Muir and Ritchie), 850; *A Manual of Bacteriology* (Hewlett), 851; *The Elements of Bacteriological Technique* (Eyre), 852; *An Introduction to the Bacteriological Examination of Water* (Horrocks), 853; *Atlas and Principles of Bacteriology* (Lehmann and Neumann), 853; *Traité de Bactériologie pure et appliquée* (Miquel and Cambier), 853; *The Mycology of the Mouth* (Goadby), 854; *Bacteriology, Catechism Series*, 855; *Les Médicaments* (Martinet), 856; *Photothérapie et Photobiologie* (Leredde and Pautrier), 856; *The Scottish Medical and Surgical Journal*, 857.
Rheumatism, Micrococcus of acute - - - - - - 185
——, Salicylate of quinine in - - - - - - - 8
Rôle of percussion in the diagnosis of early pulmonary tuberculosis - 11
Rolleston, H. D.: Diseases of the liver - - - - - 368
Roughton, Edmund W.: Insidiousness of cancer of the mouth - - 667
Royal Medical Benevolent College, Jubilee of - - - - 565

## S.

Salicylate of quinine, Note on - - - - - - - 6
Sanitary authorities, Relation to voluntary agencies - - - - 115
Santonin for lightning-pains - - - - - - - 286
Sarcoma of appendix, Primary - - - - - - 515
Scarlet fever, Infectivity of - - - - - - - 552
——, Salicylate of quinine in - - - - - - - 9
Schüller's Cancer-parasites - - - - - - - 278
Sensory disturbances of the extremities - - - - - 756
Shaw, H. Batty: Acroparæsthesia, vascular and toxic - - - 756
Sleeping sickness, Cause of - - - - - - - 281

PAGE

Small-pox and Vaccination - - - - - - - 276
SMITH, R. TRAVERS: Cerebro-spinal meningitis - - - - 338
—— WALTER G.: Notes on Urinary Chemistry - - - - 155
Snake-bite - - - - - - - 575
Snap-finger, Four cases of - - - - - - - 178
Spinal disease, Mimicry of gastric troubles by - - - 1
Sprains and their treatment - - - - - - - 285
Stammering and its treatment - - - - - - 24, 135
STOKER, SIR THORNLEY: Cancer of the Lips - - - - 577
Sunken nose treated by paraffin infection - - - - - 195
Surgery of gastric ulcer - - - - - - 277, 567
—— the nervous system - - - - - - - 528
Surgical affections of joints - - - - - - - 85
—— treatment of nephritis - - - - - - - 826
SWAN, R. H. JOCELYN: Sarcoma of the tongue - - - - 673

## T.

Tapeworms and diabetes - - - - - - - 131
Tetany and gastric dilatation - - - - - - - 44
——, Note on gastric - - - - - - - - 354
Theories of Cancer - - - - - - - 721, 724
THOMPSON, SIR HENRY: History of Cremation in England - - 112
THOMSON, H. CAMPBELL: Cerebral and Mental diseases - - - 385
—— ST. CLAIR: Diseases of upper air-passages - - - - 101
Tongue, Cancer of, difficulties of diagnosis - - - - - 595
——, ——, operation for - - - - - - - 726
——, —— , series of cases - - - - - - - 626
——, sarcoma of, lessons from 50 cases - - - - - 604
——, excision of, for cancer - - - - - - - 585
——, sarcoma of - - - - - - - - 673
——, speech after removal of - - - - - - - 727
Toxines in inflammation of the eye - - - - - - 234
Trachoma, prevention of - - - - - - - 237
Transhyoid pharyngotomy - - - - - - - 66
Traumatism as cause of cancer - - - - - - - 723
TREVES, SIR FRRDERICK: Mimicry of gastric troubles by spinal disease - 1
Trigger-finger, Four cases of - - - - - - - 178
Tubercular or tuberculous - - - - - - - 277
Tuberculosis and the medical profession - - - - - 788
——, Infectivity of - - - - - - - - 565
——, treatment with cinnamic acid (hetol) - - - - - 574
Tumour-formation, Contrast with infection - - - - - 721
Tumours, facts in causation of - - - - - - 722
TURNER, J. G.: Neoplasms of jaws - - - - - - 688
Typhoid fever, Treatment of 143, 144, 287. (*See also* Enteric fever.)

## U.

Undulant fever - - - - - - - - - 451
Universities and languages - - - - - - - - 133
UNWIN, W. H.: Cancer of the tongue - - - - - - 626
Urea, Reaction with formaldehyde - - - - - - 160
Use and abuse of high-frequency electricity - - - - - 357
Uterus, Bicornuate, rupture of - - - - - - - 82

## V.

PAGE

Vaccination League, The Imperial - - - - - - 406
Venereal disease, Prevention of - - - - - - 863
Voice and letters - - - - - - - - 135

## W.

Walker, J. W. Thomson: Surgical treatment of nephritis - - - 826
— , W. Ainley: Micrococcus of rheumatism - - - - 185
Walls, W. E.: Rupture of bicornuate uterus - - - - 82
Whitehead, Walter: Excision of the tongue - - - - 585
Wisdom of the Ancients: Hippocrates - - - - - 255

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# THE MIMICRY OF GASTRIC TROUBLES BY SPINAL DISEASE.

By SIR FREDERICK TREVES, Bart., K.C.V.O., C.B., F.R.C.S.,
*Sergeant Surgeon in Ordinary to H.M. the King; Surgeon in Ordinary to H.R.H. the Prince of Wales; Consulting Surgeon to the London Hospital.*

A VERY short experience in the out-patient department of a large hospital will reveal the person of a child who is reputed to be suffering from some gastric trouble, but who is, in reality, the subject of caries of the spine. Such a child will complain of little more than an abiding pain in the stomach. The pain will probably be about the umbilical region, in the area supplied by the eighth, ninth, and tenth dorsal nerves. The pain is due to the fact that there is an unsuspected caries of the dorsal spine, and the nerve or nerves in question are pressed upon or are in some other way disturbed. Now and then the condition is actually treated as a gastric trouble, either by a mother who is prone to physic, or by an over-busy practitioner to whom the oft-repeated "belly-ache in a child" is a weariness. There is every excuse for a failure to recognise the *fons et origo mali* at a superficial inquiry. A "belly-ache" is as much an appanage of a child as is a round game. The appetite of the child is catholic, and to the young such articles of food as cocoa-nuts and green apples are delectable. The pain, however, in the cases under consideration, does not pass off. It survives the administration of rhubarb or castor oil or such other aperient as may be in vogue. A little inquiry makes it evident that the pain is upon the surface; and the intelligent child will indicate that it encircles the body like a girdle. Moreover it abates when the patient lies down; the tongue is clean and there is no sickness. And so it comes about that the "belly-ache" which the mother ascribed to the eating of forbidden fruits is treated by a spinal jacket, and the "Mistura Carminativa" is replaced by an extension-apparatus.

These examples of mimicry when they occur in adults are apt to be even more deceptive; and this in spite of the fact

that the adult has become more precise in the localisation of pain, and has been educated out of the belief, which is current in childhood, that the primary seat of all suffering is the stomach.

The purpose of this communication is to give a brief account of two cases in adults in which the imitation of gastric disease was remarkably close.

(1.) I was asked to see a lady, about 45 years of age, in a surgical home. She had entered the home because it was considered probable that an abdominal operation would have to be performed on account of certain gastric symptoms. For several months the patient had complained of severe and distressing pain in the stomach. In general terms, this pain was said to be worse after food. There was vomiting, and the vomiting gave relief. The stomach was much dilated and the epigastric region was distinctly tender. The patient was wasting, but was by no means emaciated, and she had never vomited blood. She was quite an invalid, and had the worn aspect of an individual who had suffered much. She had been under various forms of medical treatment and was no better; and she was now turning towards surgery as towards a forlorn hope. In listening to her story it was impossible not to recall the excellent results obtained by gastro-enterostomy.

On further inquiry, however, the following facts became evident. The patient was a nervous individual and she had little to do but ponder over her symptoms: she had indifferent teeth, and was what may be called a "resigned dyspeptic." She had followed many dietaries and had abandoned them, and was now occupied with a diet of her own, which was based upon the experience that, "no matter what she ate, she always had pain." It was evident, therefore, that no little of her trouble was due to chronic dyspepsia. Her pain, beyond doubt, was real. It was severe and was vaguely situated in the epigastric region. There was tenderness in this part and it was noteworthy that this tenderness was superficial. The pain was said to be worse after food, but this was not precisely the case It was worse during the day-time and was better at night, when she was not eating. The vomiting was infrequent and trifling She felt better after she was sick. The dilatation of the stomach was very marked, and this phenomenon and the pain appeared to remain unaffected by any treatment.

It is needless to say that dilatation of the stomach may depend upon various ill-recognised nerve-conditions, and that a narrowing of the pylorus is by no means the commonest, nor even a common, cause of the same. As bearing upon this, I may mention that I had under my care an officer who was shot through the abdomen by a Mauser bullet during the Boer war. The minute puncture made by these missiles is well known. From the direction which the bullet took there was little doubt but that the left section of the stomach was penetrated. The patient had very few symptoms after he fell, and he made a rapid and excellent recovery. He was left, however, with one distressing symptom, viz., a considerable and persistent dilatation of the stomach. In spite of all treatment this inconvenient condition maintained itself unchanged for some twelve months, when it gradually vanished. It must have been due to some nerve-injury.

The lady whose case is under discussion gave one the impression of being very ill, and she was certainly very miserable. Having in mind the case which is described below, I ventured to examine the patient's back. I found the deformity of Pott's disease in the dorsal region; and the patient then explained that she had had caries of the spine when a child. Although no complaint was made of the back, a detailed examination rendered it probable that there was some recrudescence of the old bone-trouble. Be that as it may, the pain, the sickness, and the dilatation of the stomach gradually vanished after no more elaborate treatment than a long confinement to bed in the recumbent position.

(2.) The patient in this instance was a master-shipwright, aged 50. He was a man who had led an active life and had enjoyed exceptional health. Some ten months before I saw him he began to complain of indigestion, and at once consulted his medical attendant as to this trouble. His main symptom was pain after food. This pain increased and became intense, but it was always aggravated by food. Previous to the onset of these symptoms he had never suffered from dyspepsia, and his bowels had always acted naturally. During the ten months in question he had been under constant medical care. Every method of treatment had been tried, and every type of diet employed, yet in spite of all this he become steadily worse and

worse. He never once complained of his back. He continued at his work in the shipbuilding yard, and always maintained that he was easier when he was at work. I recall the fact that when he came to see me, he entered the room with his body much bent and with one hand pressed over his stomach. He was pale and emaciated, and evidently very ill. His chief complaint was of pain in his stomach and of increasing weakness. The pain was over the pyloric section of the stomach, and was described as a burning pain. It was as bad at night as it was in the day-time, and, as has been already mentioned, he considered that he had least pain when he was at work. The pain was always more intense after food. He stated that any food he took lay like a leaden weight in his stomach. At first —when he was on a normal diet—he would frequently make himself sick after his chief meal by putting his finger down his throat. So immediately did pain follow the eating of food, that now and then he left the dinner-table to empty the stomach by self-induced vomiting.

He gave up meat, as it gave him so much pain, and limited himself to fish ; but for the six weeks previous to his visit to me he had been compelled to give up fish. He was living entirely upon fluid food—beef-tea, milk, and eggs. He had no appetite, and his great anxiety was to keep his stomach empty.

He was never sick except when he made himself sick, and he had never vomited blood. He was very weak, but he had continued his work regularly until five weeks before I saw him. On examination, I found the stomach a good deal dilated. The upper part of the right rectus muscle was contracted, but no tumour or swelling could be discovered in the abdomen.

He was most anxious that "something should be done," and expressed his intention of ceasing to take food until he had been in some way relieved, as his life had become unbearable. He was losing ground rapidly, and it appeared desirable that an exploratory incision should be made over the region of the pylorus at the site of the pain, which had been located there for some ten months.

I thought it probable that, when the rectus muscle was relaxed by an anæsthetic, some growth about the pylorus would be discovered, and that such growth would explain the pain and the dilatation of the stomach. The patient was

accordingly anæsthetised; and when anæsthesia was complete, I noticed that the dilatation of the stomach had almost vanished. The rectus muscle became in due course relaxed, but nothing abnormal was discovered beneath it.

I opened the abdomen and examined the stomach, the pylorus, the pancreas, the liver, and the parts adjacent thereto. I found every organ normal. There was no sign of any growth. There was not even a solitary adhesion. I did not feel that there was any ground for actually opening the stomach itself, and there was still less ground for the gastro-enterostomy which had been contemplated as a possibility. The abdomen was closed without the least light having been shed upon the mystery.

The patient recovered well and his pain was to some degree relieved. Several days after the operation the nurse drew attention to a slight lump between the patient's shoulders, which she had discovered by accident. Of this lump the patient himself was entirely unconscious. It proved in due course to be a sarcoma growing from the mid-dorsal region of the spine. After a while paraplegia developed, and the patient died about a month after the exploratory incision. The tumour liberated from restraining fasciæ grew apace.

There is no doubt but that this growth in the dorsal spine produced the symptoms, which appeared to be, from first to last, wholly gastric. When the sarcoma was discovered, I questioned the patient about his back; but the result was negative. He had had some pain about the base of his sacrum, but none in his back. He had stooped a little of late because the posture eased the pain in his stomach. The long railway journey to London had in no way added to his discomfort, and jolting had never caused him inconvenience. To the end he was never induced to believe that his spine had anything to do with his so-called "indigestion"; and to him at least it never seemed incongruous that a contemplated operation on the stomach could be an excusable feature in the treatment of an affection of the spinal column.

The moral to be derived from these cases is this—that suspicion may be aroused as to the genuineness of a gastric trouble, when pain is the all-predominating symptom, when it is intense and persisting, and when vomiting is at the same time either absent or insignificant.

# A NOTE ON SALICYLATE OF QUININE.

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In the second edition of *Merck's Index*[1] salicylate of quinine is described as follows:—

"*Chininum salicylicum cryst.* (*Pharmacopœia Romana*, III. Edition.) Salicylate of Quinine. $C_{20}H_{24}N_2O_2 . C_7H_6O_3 + H_2O$. White crystals soluble in 20 parts of alcohol, very slightly soluble in water. Antiseptic, antipyretic, analgesic. Used in 'Typhus' (*i.e.*, enteric or typhoid fever), malaria, and rheumatism, especially in sciatica. Dose: 0·1—0·3—0·5 grm. (1½—5—7½ grains) several times a day."

In the tenth edition of Martindale and Westcott's *Extra Pharmacopœia* (1901), Quininæ salicylas (quinine salicylate) is stated to occur "in white, silky, flexible, acicular crystals, sparingly soluble in water, about 1 in 1,200,[2] and the addition of mineral acids helps its solubility only by liberating salicylic acid, which may crystallise out." It "should be administered suspended in water, or in cachets, or in pills with syrup of glucose as an excipient. In 3-grain pills, commended for diarrhœa and neuralgia." According to Martindale and Westcott, the dose is 2 to 6 grains (0·13 to 0·4 gm.). The only reference they give to the use of 3-grain (0·2 gm.) doses of the preparation is to the first volume of the *Lancet* for 1880 (pages 540 and 582), where it is stated that quinine salicylate is useful in rheumatic gout, 3 grains being given every six hours. This observation is based on the experience of Dr. Archibald Hewan, of Chester Square, London. He tried the remedy first in his own case in February, 1880, at the suggestion of a lady whose son had recently suffered in Paris from a severe attack of rheumatic gout, in which salicylate of quinine had proved of

[1] *Merck's Index.* II. Auflage. (Abgeschlossen Ende, Juli, 1902). Darmstadt; E. Merck. Page 69.

[2] According to P. Squire, the solubility is 1 in 630 parts of water. (*Companion to the British Pharmacopœia.* Seventeenth edition. 1899. Page 528.)

signal use. In March, 1880, Dr. Hewan had further opportunities of testing the value of the preparation, and the results of the treatment are recorded in the *Lancet* for April 10, 1880 (page 582).

I am indebted to Dr. Ninian M. Falkiner, F.R.C.P.I., for the following note, based on an experiment which he made in answer to a query which I put to him:—"If two grains of quinine sulphate are mixed with one fluid drachm of distilled water, and dissolved by the addition of two minims of dilute sulphuric acid; if to this a solution of salicylate of sodium (containing the equivalent of two grains of quinine sulphate dissolved in one fluid drachm of water) be added, a precipitate of salicylate of quinine is immediately formed. This precipitate in its turn dissolves when diluted to about one and a half fluid ounces with distilled water, representing roughly the solubility of salicylate of quinine (1 in 630, Squire).

"If a large quantity of dilute sulphuric acid be used in dispensing this salt, it is possible that it would be decomposed, and salicylic acid would be deposited."

It is now several years since it occurred to me to prescribe sulphate of quinine and salicylate of sodium in combination in a mixture for acute rheumatism. Pharmaceutically the result was embarrassing, for in the mixture ordered the very insoluble salicylate of quinine was formed. However, this difficulty was soon got over by prescribing the properly prepared salt, as recommended by Martindale and Westcott; and from that time to the present date I have come to rely more and more on the preparation in the treatment of many infections.

In the new and revised edition of his *Manual of Medical Treatment*, Dr. I. Burney Yeo, F.R.C.P., writing on the treatment of acute rheumatism by sodium salicylate, observes: "In patients who appear to be unduly depressed by the salicylic treatment, it is a good plan to alternate it with quinine in 2 to 5-grain doses in effervescence." He adds a foot-note reference to page 609 of the first volume of his *Manual*, where he gives an elegant prescription for the administration of quinine in effervescence, but he makes no mention of salicylate of quinine.

The object of this brief communication is to point out that quinine salicylate appears to fulfil this and many other indications in practical therapeutics.

I. As an *anti-rheumatic* the preparation has few equals, and is surpassed only by salicylate of sodium. This salt is, however, distinctly depressing, and should not be pushed after the first few days of treatment. In such a case, the quinine salt may be substituted with great advantage in 5-grain doses thrice daily, given in cachets or in a compressed form. In subacute rheumatism, also, quinine salicylate is most beneficial.

II. In *Diphtheria* a tolerably wide experience during the past three years has led me to rely on—(1) antitoxin in full doses (2,000 to 3,000 units), repeated in 24 or 48 hours as required; (2) resorcin used as a throat-spray, in the proportion of 10 grains to the ounce; and (3) quinine salicylate in doses of 3 or 5 grains thrice daily, according to the patient's age and idiosyncrasy.

III. When writing on *Influenza* for the fifth volume of the *Encyclopædia Medica*, edited by Dr. Chalmers Watson, and published in 1900, I said that in the treatment of that disease "quinine salicylate may be given in wafer cachets containing 3 or 5 grains as required, where the combined effects of salicylic acid and quinine are desired."

IV. In *Pneumonic Fever*[1] the salicylate has proved most useful as a tonic and general "alterative." By this latter term I mean a remedy which improves the general state of the patient and so gives the disease-quelling forces of the organism free scope in their conflict with the existing toxæmia.

V. It is in *Enteric Fever* that the happiest results have been obtained from quinine salicylate. This drug seems to me to be far superior to salol or any of the other so-called intestinal disinfectants, the invaluable salicylate of bismuth not excepted. Given early in the disease, perhaps after a moderate dose of calomel has scavenged and disinfected the intestinal canal, and continued throughout the fever-movement or even into convalescence, quinine salicylate has appeared to regulate the bowels, correct the fœtor of the evacuations, check tympanites, and control any tendency to vesical catarrh. Under the treatment, the fever has seemed to run a mild and favourable course, the temperature falling gradually from the end of the second week. Also the more serious complications of the later

[1] Acute lobar pneumonia.—ED.

stages of the fever rarely developed in cases so treated. Be it observed, that the salicylate has never been given by me as an antipyretic, nor could it so act in the moderate doses usually prescribed. In my opinion energetic antipyresis in the treatment of enteric fever cannot be too emphatically condemned. Undue reduction of body-temperature is the last thing to be desired or attempted in any form of fever. With all my heart I adopt Arnaldo Cantani's aphorism: "Das Fieber, das in so vielen Krankheiten der beste Verbündete des Arztes ist." ("Berlin International Medical Congress, 1890.")

VI. In *Scarlatina, Erysipelas,* and *Measles* also the salicylate of quinine promises well as a general disinfectant and tonic. The almost specific effect of salicylate of sodium in erysipelatous affections is well known since Hallopeau, of Paris, published his researches on the subject in *L'Union Médical* for May 1, 1881—more than one and twenty years ago. I do not suggest the substitution of the quinine for the sodium salt, which may be applied topically in the form of a 5-per-cent. lotion on a compress, in addition to its administration internally. But the quinine preparation will prove an excellent adjuvant both in erysipelas and scarlatina, particularly in the advanced stages of these blood-destroying and enervating diseases, when a more tonic treatment is indicated.

VII. In *Chlorosis*—that form of anæmia which so largely depends upon auto-intoxication, the result of habitual constipation in young women between the age of 15 and 25 years—quinine salicylate cannot fail to establish its reputation as a gastro-intestinal antiseptic and disinfectant. In such a case the Bacillus coli communis, a non-pathogenic microbe under normal and healthy conditions, may very likely assume a pathogenic rôle, as it does in enteric fever, dysentery, summer diarrhœa, and infective appendicitis. If this be so, an essential part of the treatment must be intestinal disinfection.

On Thursday, November 13, 1902, I was called to see, in consultation with Dr. Rodolph Burnes, a young lady, aged 19, who was so extremely anæmic as to be in danger of her life from repeated attacks of syncope. The medical history was one of habitual constipation, anæmia, and irregular menstruation, since she came to reside in Dublin two and a half years ago.

The house in which she lived was modern, but abutted on a road bordered by an open drain, towards which the window of her bedroom faced. An outbreak of enteric fever had occurred about eighteen months previously in the immediate neighbourhood. The patient's sister had died of acute peritonitis a short time before our visits. Dr. Burnes had treated the patient with aperients and a mild preparation of iron. We advised her removal from her father's house, took steps to regulate the bowels, and put her on 5-grain doses of quinine salicylate three times a day. She improved rapidly under this treatment.

VIII. Recently, in a sharp attack of *Herpes Zoster*, connected with the fourth cervical nerve on the left side, in a married woman, aged 28, quinine salicylate undoubtedly relieved pain, and seemed also to play successfully the part of a tonic.

The above are a few instances in which my personal experience of quinine salicylate has proved so satisfactory as to encourage me to bring the preparation under the notice of the medical profession. It is already official in the French *Codex*, and in the Mexican, Russian, Spanish, and Swiss *Pharmacopœias*.

# THE RÔLE OF PERCUSSION IN THE DIAGNOSIS OF EARLY PULMONARY TUBERCULOSIS.

By R. W. PHILIP, M.A., M.D., F.R.C.P.,

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THERE is perhaps no more important diagnosis in the sphere of clinical medicine than that of the early manifestations of pulmonary tuberculosis. It is needless to enlarge on the significance of the diagnosis in relation to both prognosis and treatment. None the less it is to be feared that methods of diagnosis of ready application are not so fully appreciated in practice as is desirable.

It is my purpose in the present contribution to dwell especially on the great delicacy of the method of percussion, when efficiently applied, in connection with such diagnosis. There is a tendency to regard percussion as of little service, save where considerable infiltration of the lung has occurred. I have been much struck, in conversation with colleagues at the bedside, with the tendency to make light of refinements of percussion. This is due in part to lack of practice in the method, and in part to ignorance of the possibilities. There is indeed legitimate cause for fear lest, with the advance of bacteriological and other "laboratory" methods of diagnosis, skill in educing and interpreting physical signs become lost. I yield to no one in appreciation of the value of the determination of the tubercle-bacillus in the sputum. But it must be kept in view that after all the information yielded by the discovery of the tubercle-bacillus in the expectoration is limited to the pathogenesis of the disease. The extent and limits and stage of the affection, in the given case, are determined thereby to a very small extent. It must also be borne in mind that pulmonary tuberculosis has commonly made a considerable advance before the tubercle-bacillus comes to be discharged in determinable quantity in the expectoration. Moreover, there are not a few cases in which, either throughout the entire course, or during a portion of the illness, no expectoration occurs. Similar considerations apply to the

tuberculin test—most serviceable though it be in relation to obscure cases, particularly when expectoration or other discharge is absent.

I have been impressed, time after time, by the statement on the part of competent observers, that while the tubercle-bacillus had been determined in the expectoration of this or that patient, they were unable to determine the presence of physical signs pointing to affection of the lung. More particularly has this negative statement been made with regard to the results of percussion, and this in cases where an attentive application of exact methods readily showed the contrary. Indeed, I incline to the belief that, by the application of the refinements of the percussion-method to be presently considered, the early diagnosis of pulmonary tuberculosis may be more certainly established than by auscultation. At least in doubtful cases the evidence afforded by the percussion-method is of the first moment.

What follows has more especial reference to the diagnosis of early apical changes. But, *mutatis mutandis*, the method is in part applicable to the diagnosis of disease in other portions of the chest.

I wish to draw attention particularly to the following points:—

1. The Significance of the Supra-clavicular Triangle in relation to Early Changes.
2. The Best Line of Percussion for the Determination of Slight Degrees of Apical Involvement.
3. The Value of what I term "Tidal Percussion."

### 1.—*The Significance of the Supra-clavicular Triangle in relation to Early Changes.*

A large number of observers restrict supra-clavicular percussion to a small area of approximately a finger's breadth in extent immediately above the upper border of the clavicle. If this area be fairly resonant and approximately equal in resonance to the corresponding area of the other side, the apex is apt to be passed as healthy. In such procedure it is lost sight of that the normal apex of the lung reaches 1½ to 2 inches above the clavicle. In keeping with this measurement, lung-resonance should be determinable in the healthy adult to a

PLATE I.

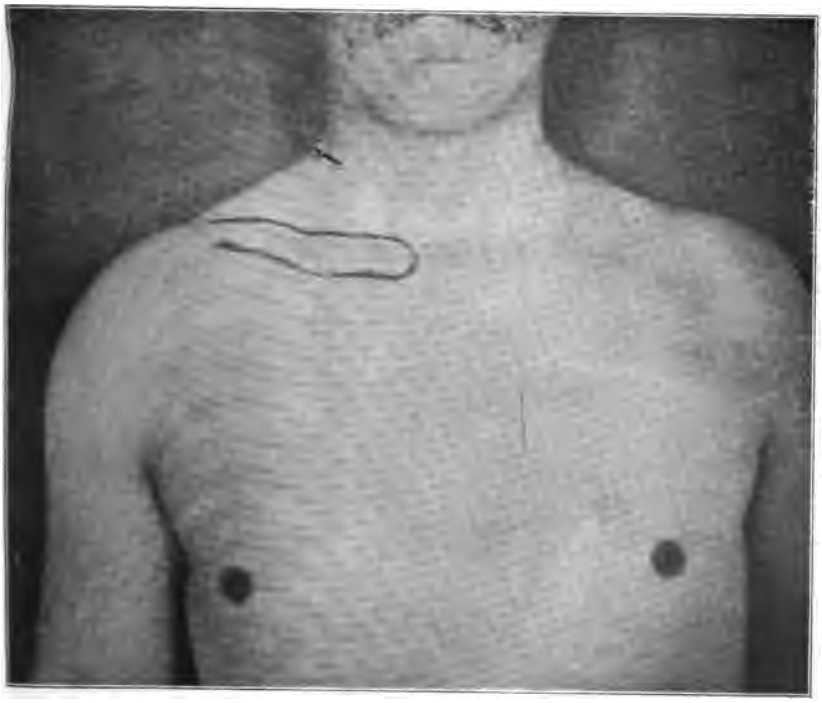

Fig. 1. *To illustrate the point that the normal upper limit of* ***lung-resonance*** *as determinable by percussion reaches* 1½ *to* 2 *inches above the clavicle. The short upper line indicates the* ***upper limit of resonance*** *: the outline below is that of the clavicle.*

## Plate II.

Fig. 2. *Showing slight impairment of resonance over whole supra-clavicular area* (see *foot-note*).

PLATE III.

Fig. 3. *Showing impairment of resonance over first finger's breadth in supra-clavicular area, and higher up marked dulness* (see *foot-note*).

PLATE IV.

Fig. 4. *Showing gradual increase of apical dulness from clavicle upwards* (see *foot-note*).

similar distance above the clavicle; in other words, percussion may be practised some three fingers' breadth above the upper border of the clavicle.

The fact that the lung reaches so high above the clavicle has sometimes been contested in my hearing. The suggestion has been made that, on post-mortem examination, the apex of the lung does not extend so high. It must be remembered, however, that the limits of the lung after death, and more particularly when the chest has been opened, are not the same as the limits of the lung during respiration.

As the result of a large number of examinations of the apices of presumably healthy persons, by the percussion-method, I am satisfied that 1½ inches above the clavicle is rather below the mean elevation, and that frequently lung-resonance may be traced to 2 inches above the clavicle, and even higher. Fig. 1 illustrates the normal upper limit of apical resonance. For all practical purposes the lung-resonance on the two sides reaches the same level.

Assuming that lung-resonance may be determined in the healthy subject over an area of three fingers' breadth above the clavicle, let us consider the results observable in disease. In a given case, percussion over the lowest finger-breadth may be resonant, while that over the second may be impaired, and that over the third be actually dull. Or there may be fair resonance over the first two finger-breadths, while the third yields a dull percussion-sound; or there may be impairment over the whole area. In this connection comparative percussion, that is, percussion over corresponding finger-breadths above the clavicles of the two sides, is of the greatest importance. By means of this, what might be passed as the gradual tailing away of lung-resonance towards the apex may be found to be definite dulness, when compared with the more healthy resonance over the entire area of the other side.

The accompanying photographs (Figs. 2, 3, 4)[1] illustrate deviations from the normal which may occur in the supra-

[1] In Figs. 2, 3, and 4, degrees of dulness are indicated by oblique lines: thus,—
/ = slight dulness;
// = marked dulness;
/// = absolute dulness.

For the execution of the photographs from which Figs. 1–9 are taken, I have to thank my Resident Physician, Dr. Ian Stewart.

clavicular triangle in conditions of early infiltrative change, where no dulness is perhaps determinable either in the clavicular or infra-clavicular areas. Indeed, it may be frequently observed that clavicular and infra-clavicular percussion affords full resonance or hyper-resonance in association with varying degrees of supra-clavicular dulness. Such complemental resonance or hyper-resonance is apt to deceive the unwary observer. It ought rather to direct particular attention to the supra-clavicular area.

### 2.—*The Best Line of Percussion for the Determination of Slight Degrees of Apical Involvement.*

I am anxious to draw attention to an application of the method of percussion for the purpose of determining early apical change, which I am in the habit of using and believe to be of the greatest value. It forms an important addition to the "finger by finger" method we have just considered.

*Procedure.*—The pleximeter finger of the left hand is placed across the apex of the lung from back to front, approximately in a plane at right angles to the vertical diameter of the lung. Percussion is practised with the middle finger of the right hand in a direction at right angles to the pleximeter. The drawing (Fig. 5) illustrates sufficiently well the method of procedure. The percussion-stroke should be firm and sharp, but not too strong.

When in doubt as to the integrity of an apex, or of both apices, in cases where the change is admittedly slight, I have commonly found percussion in this line of the greatest assistance. The delicacy of the method has impressed me much in conducting my clinique on the diagnosis of chest-disease. Again and again I have observed competent clinicians fail to determine the presence of the slighter degrees of consolidation by the ordinary method, or manifest hesitancy as to their results, and express surprise at the ease and certainty of determination by the use of the percussion-line I have proposed. I have confidence in recommending it as of much diagnostic service in doubtful cases.

### 3.—*The Value of Tidal Percussion.*

Sufficient attention has not been directed to the significance of the results obtainable by what I have termed "Tidal

PLATE V.

Fig. 5. *To illustrate the best line of percussion for the determination of slight degrees of apical involvement.*

PLATE VI.

Fig. 6. *To illustrate tidal increase of resonance in healthy subject.*

## Plate VII.

Fig. 7. *To illustrate the relatively slight degree of tidal increase of resonance in a sedentary subject.*

## Plate VIII.

Fig. 8. *Tidal increase of resonance : on the left side sufficient, on the right side incomplete.*

PLATE IX.

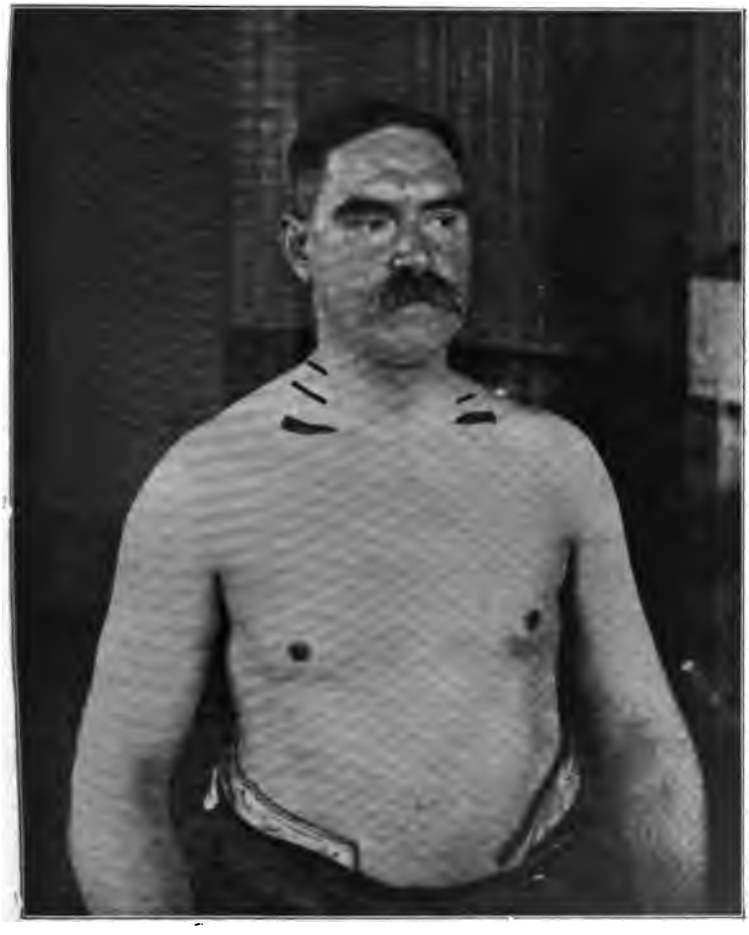

Fig. 9. *Showing tidal increase of resonance good on right side, while it is absent on left side.*

Percussion." By this I mean the practice of percussion—more particularly at the apices, though it is no less applicable to the bases and the anterior edges—alternately during expiration (or easy respiration) and during full inspiration. The difference between the limits of supra-clavicular resonance in expiration on the one hand and in full inspiration on the other are very considerable in the healthy subject. The accompanying photograph (Fig. 6) illustrates the point. The lower line indicates the limits of lung-resonance in expiration, and the upper line that in full inspiration. In varying conditions of disease considerable modification of the tidal resonance takes place. Thus, in the sedentary subject with relatively lazy lungs (Fig. 7) the tidal increase of resonance is comparatively slight, and probably equally so at both apices. In cases of commencing consolidation—it may be before actual percussion-dulness is determinable—a limitation of the tidal resonance at one or other apex may be noticed. With the advance of infiltrative changes, even in slight degree, limitation of the tidal change becomes more marked, and affords important corroborative evidence in doubtful cases. In the photograph (Fig. 8) the amount of tidal change on the left side is comparatively complete, while on the right side it is much below the normal. In Fig. 9 the tidal change on the right side is fairly good, while on the left side it is *nil* (the total extent of supra-clavicular resonance being markedly reduced).

The consideration of tidal resonance has a further application in relation to the course of the disease from time to time and its consequent prognosis. As the progress of the disease becomes arrested, a considerable improvement in the tidal resonance is frequently to be noticed. The return of fuller tidal resonance affords in my opinion one of the most satisfactory indications of improvement. Contrariwise, with the advance of infiltration the amount of tidal change becomes reduced.

# ON CERTAIN DISEASES OF THE CORNEA MET WITH IN CHILDREN.

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Of the numerous abnormal conditions met with in the eye in general practice there are, perhaps, none more important than the various forms of keratitis which occur with such marked frequency in childhood.

If left alone, or treated improperly, they may mean to the individual any degree of impairment of vision up to complete blindness. No one fails to recognise the extreme benefit that accrues to an old person who, through the successful removal of a cataract, is enabled to see for the few remaining years of life. Far greater, however, is the benefit which ensues on curing a child of keratitis, which may otherwise cause blindness, or practical blindness, for the whole of a lifetime. This is a point of view which seldom has sufficient stress laid upon it. Similarly, glaucoma, which may cause blindness if untreated, is a disease of adult life or old age, and although the benefit conferred upon the community by Graefe's discovery of iridectomy in this disease is great, yet it is not such cases which we shall find preponderating among the inmates of asylums for the blind. When we consider what an enormous proportion of blind persons have lost their sight through diseases which are absolutely preventable and very amenable to treatment, we can then appreciate the responsibility of the medical practitioner when called to see a case of ophthalmia neonatorum, interstitial keratitis, or the much more common case of phlyctenular ophthalmia.

Most practitioners, though unfortunately not all even yet, appreciate the gravity of ophthalmia neonatorum; and if they do not at once apply active remedies, they at least transfer the case to a hospital or to a surgeon more skilled than themselves in the treatment of eye-diseases. Provided this is done at a sufficiently early stage and before ulceration has

set in, practically no case ought to be lost. This statement may seem sweeping, and so it is; but it is none the less a fact that in children the disease is one which can be very readily cured.

In this connection we may first briefly allude to the subject of *Interstitial Keratitis*—that terrible disease which in 90 per cent. or more of the cases is due to congenital syphilis. The ophthalmic surgeon recognises how serious this disease is and foresees the numerous complications which may arise if it be not properly treated; yet such cases are somewhat casually looked upon by the average medical man, and when keratitis is diagnosed little further interest is taken. Only too often has one seen this disease diagnosed, for, when present, it is easy of recognition; and, in a child especially, any severe corneal affection is apt to be called interstitial keratitis. No one is, however, justified in committing himself to this diagnosis without taking the precaution of everting the upper lid, to see whether the so-called "interstitial keratitis" is not in reality the pannus due to trachoma. I do not mean to say that the two conditions of the cornea are indistinguishable to the skilled observer; but I do say that the number of cases of trachoma that are for months treated as keratitis—naturally with little or no result—is far greater than most practitioners would be inclined to admit, unless they are daily brought into contact with out-patients in an eye-hospital.

In the present article, however, I wish more especially to draw attention to the cases which are considered, and are in reality, much less serious, though the after-effects are certainly quite severe enough not to allow them to be dismissed without a thorough knowledge of their diagnosis, ætiology, and treatment. I refer to the very common disease, *Phlyctenular Ophthalmia.* It is known by a great variety of names—phlyctenular conjunctivitis, phlyctenular keratitis, conjunctivitis eczematosa, &c.

In order to understand the course of this disease, it must be remembered that the ocular conjunctiva does not cease at the corneal margin, but extends in a modified form over the cornea; and that therefore there is no hole in the conjunctiva, as is often imagined. The chief difference between the conjunctiva covering the cornea and that covering the sclera is that in the former it is reduced to a specially-modified stratified epithelium,

whereas in the latter situation it contains vessels and connective tissue, and its epithelium is of the laminated "pavement" variety.

Although in this disease we so frequently use the term phlyctenular keratitis, yet in reality it is not a disease of the cornea, but of the conjunctiva; and the cornea only becomes affected secondarily, because it happens to be immediately beneath the tissue, viz., the conjunctiva, which is the seat of this disease.

A study of its morbid anatomy gives us a considerable insight into the condition we have to deal with. In an ordinary typical case the disease develops in a child who is probably insufficiently or improperly fed, and who has his general health undermined by living amid unhygienic surroundings in the absence of fresh air. Children brought up in large towns are far more susceptible to this disease than are those who live in the purer air of the seaside or country. Very frequently we find that the child has but recently recovered from some acute disease, such as measles or scarlet fever. On examining the eye in an early stage, we shall find one or more, frequently many, small elevations, usually situated about the limbus of the cornea, with a tendency to develop over the sclera rather than over the cornea. On magnifying one of these spots, it is seen to be distinctly elevated above the surface, and the vessels leading up to it are injected. If we had at this time the opportunity of examining one of these nodules microscopically, we should find that the elevation was due to an accumulation of inflammatory cells beneath the epithelium: this is, first of all, raised up, and as the accumulation gets larger, the cells on the surface give way, and thus a small ulcer is produced. The cells beneath this degenerate and melt away, and in a few days the elevation has disappeared and the ulcer has healed. This is the simplest way in which the nodule undergoes spontaneous cure.

It is by no means always that this simple state of affairs obtains. Often the nodule undermines the epithelium covering the cornea, and then we get the condition so frequently described as phlyctenular keratitis. The same process exactly goes on as above described, but now the vessels, which were seen before leading up to the nodule, follow it on to the

cornea, and hence we see superficial vessels running beneath the epithelium to the point of irritation. The cells may burrow further and further towards the centre of the cornea, and are still followed by the blood-vessels. A similar method of cure may result here to that before described, and if so, the vessels will degenerate and cease to contain blood; but they will be visible for ever afterwards as fine lines running across the cornea.

If now this ulcer has stopped short of the pupillary area, little or no deterioration of vision will occur, unless it be due to the development of some irregular astigmatism produced during the healing process. If the disease remains confined to the sub-epithelial region, little or no alteration of vision is likely to be noted.

It will be remembered that immediately beneath the epithelium covering the cornea is Bowman's membrane, or the anterior elastic lamina. This is dense and hard, and is a great safeguard to the interstitial substance of the cornea immediately beneath it. So long as this remains intact, we need have no fear of a permanent opacity being left, no matter how bad an eye may look nor how much photophobia may be developed. This membrane, however, will not resist an indefinite amount of irritation, and we find that in the more severe cases it gives way, and the inflammatory cells then begin to wander into the substantia propria of the cornea. This condition is bound to leave a permanent opacity behind.

There is, however, even a greater danger than this, viz., that the comparatively soft connective tissue of the cornea may break down. This may even go on to the extent of causing a perforation, and it is to these severe cases that attention is to be so particularly directed. These are the cases in which, even if actual blindness be not caused, yet the sight may be rendered so defective that numerous occupations are closed to the sufferer, and his view of the world generally will be so much contracted as to be a serious drawback, not only to his education, but also to his general usefulness as a member of the community.

The ulceration may also extend backwards, and not infrequently a patch is seen on the sclerotic which has a discharging surface. These, however, do not extend deeply, for the sclerotic

is sufficiently hard to prevent the inroads of the ulcerative process.

The photophobia, which has been mentioned in passing as a symptom of the condition, has to be explained. It is well known how sensitive the cornea is, and that this is due to the very abundant supply of nerves, the terminations of which ramify between the epithelial cells covering it. When these are pressed upon by accumulated inflammatory cells, or irritated by chemical products of broken-down tissue, or simply by exposure at the bottom of the ulcer, considerable pain and photophobia are produced, which can be temporarily overcome by paralysing the nerve-endings with cocaine.

Although single or individual nodules are not very difficult to cure, yet the disease is often most troublesome, owing to the great tendency of the lesions to develop one after the other, so that no sooner is one cured than another crops up. This may go on for a long period of time. When one considers how many of these lesions develop into deep ulcers, which will leave permanent marks behind, some idea of the seriousness of the condition is obtained.

If we examine these patients more critically, we shall almost invariably find that they are suffering from eczema about the nose, face, or mouth, and sometimes also on other parts of the body. In fact, we shall not be far wrong if we look upon the disease (as its name implies) as a development of eczema upon the conjunctiva itself. Its situation is determined chiefly by the character of the epithelium covering the cornea and neighbouring conjunctiva, which is so different from that covering the palpebral conjunctiva. A study of the epithelial surface of the conjunctiva in its different parts is instructive. The epithelium covering the cornea is of the special stratified variety, which is so familiar an object under the microscope, while as it passes away from the cornea it gradually becomes less stratified and more columnar. Now it is in the region of the stratified epithelium that we find this condition developing; and it is the infiltration of inflammatory products among these epithelial cells which causes the irritation to the nerve-endings, which ramify in their minute processes among the cells.

For the successful *treatment* of the condition one must study and be acquainted with the morbid processes which

accompany it. That it is of an eczematous nature few will deny ; and it is also a fact that it occurs far more frequently in underfed and badly nourished children than in any other class of the community. Its most distressing symptom is photophobia, and its most serious result is the impairment of the transparency of the cornea caused by the nebulæ which remain.

Iron is, perhaps, the drug most commonly prescribed for these children, and I am convinced that this treatment frequently leads to the condition being much prolonged. The extreme irritability of the eyes is aggravated by its use in the early stages, and I have seen many cases in which iron has been used too soon : the result has been that the next time the patient is seen, the photophobia has, to a large extent, increased. It is useful enough in the later periods, but the earlier stages are far better treated with small doses of mercury internally. A powder which I am very fond of using is one which is found in the Moorfields Pharmacopœia, consisting of:—Grey powder, gr. ii; powdered belladonna leaves, gr. i ; and sugar of milk, gr. ii. Half a powder twice a day is what I usually prescribe.

In addition, atropine is essential, and as a rule I prefer drops of a solution containing gr. iii to ℥ i, though, if more convenient, atropine ointment of a similar strength may be employed instead. The eye should be bathed frequently with boracic lotion, chiefly for the purpose of keeping it clean, and it is but seldom that this treatment fails to make a marked improvement in a very short time.

Later on an ointment, consisting of two to eight grains of the yellow oxide of mercury in an ounce of vaseline, is useful; but in the acute stage it is far too irritating, and as a rule aggravates all the symptoms. If the eye be sufficiently quiet to tolerate it, it is most useful, and it is sometimes convenient to use a little atropine with it (*2* grains to the ounce). At this stage iron is most useful, either the Syr. Ferri Phosph. Co. or the Syr. Ferri Iodidi.

All sorts of measures have been advocated for the cure of the photophobia, and a mere enumeration of them would take much space. To mention only a few, blisters, setons, blowing into the eye powdered glass or calomel, and holding the child's head under water, have all been recommended. With regard

to blisters to the temples, little good is likely to result from them, though they are harmless and might be tried. Setons need only be mentioned as a relic of the past, for it is unlikely that among modern surgeons anything so barbarous and so utterly opposed to the tenets of antiseptic surgery would be advocated. I have occasionally seen setons used, and the only definite results which I have been able to ascribe to their use have been spreading cellulitis of the head and neck, and secondary hæmorrhage from the temporal artery. I have fortunately not seen them used often enough to produce septic pneumonia or pyæmia, though doubtless, if they were employed more frequently, such cases would, as in times gone by, be anything but unknown.

It is hard to overthrow ideas which have been handed down for generations, and so we see the seton advocated for eye-diseases far more frequently than for the treatment of any other condition. A seton only can act by causing counter-irritation, and a more filthy way of applying it could hardly be imagined than by a thick silk thread, soaked in pus and putrid discharges, and containing organisms enough to infect a ward.

It may be said that a seton ought never to be allowed to get into this condition, but that it should be under an antiseptic dressing. Granted this should be so, the obvious objection is that the seton under these conditions is practically not an irritant at all, and can therefore, on no theory, be supposed to be of any use. If counter-irritation is of such prime importance, it can easily be applied in some aseptic way, and not in such a form that its action must depend upon the chemical products of putrefaction.

The blowing of calomel into the eye is still used by some, but it is far better to use such an irritant as calomel or yellow oxide of mercury in the form of an ointment, which is as easy to apply, and far less alarming and painful to the patient.

One of the chief causes of the continuation of the photophobia is the development of fissures and excoriations at the outer canthi; and if they can be cured, half the battle is over. If these fissures be stretched and made to bleed on the child opening his eyes, a great deal of good is likely to accrue. By far the best treatment is to give an anæsthetic, and then

to stretch the lids as widely open as possible; this will cause bleeding, but after it has ceased, the lesions will heal. In order to make more certain of this result, the fissures may with great advantage be painted with a solution of nitrate of silver (5 to 10 grains to the ounce), and at the same time the lids and any phlyctenular ulcers present may also be painted. Atropine should then be put in, and no bandage of any sort applied.

An old-fashioned method of doing the same thing is to hold the child's head and face in water till he commences to struggle; in the process the eyes are widely opened under water, and great good frequently results. It may be objected that this method is a rough one, but it is astonishing how quickly children get used to it and cease to mind it in the least. The administration of an anæsthetic is, however, far more effectual, and is open to less objection, as the condition present can be seen and treated. Among the comparatively simple cases that are met with in the out-patient room there are perhaps none which repay a little extra care and attention so well as these; and it is thoroughly well worth while to anæsthetise the patient, and to make a complete examination of the condition present.

In conclusion I should like to enter a protest against the use of cocaine when ulceration of the cornea is present or feared. As used by the surgeon to aid his examination, I have not a word to say against it; but if it is given to the patient to use it will be applied far too frequently, and it will destroy the epithelium and favour perforation. The same might well be said of alum and sulphate of zinc.

It is astonishing what a vast amount of good results, in most cases, from the treatment above indicated; and were it more generally adopted, I feel sure we should not hear of the resort to such antiquated methods as setons, which are probaoly now, at any rate, used only as a last refuge in such cases as prove extremely intractable.

# STAMMERING, AND ITS TREATMENT BY THE GENERAL PRACTITIONER.

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THE subject of stammering is one which has received comparatively little notice in most of the standard text-books of medicine; many of them, in fact, scarcely allude to the condition at all. Hence it unfortunately happens only too often that, if a case of stammering does come under the notice of a practitioner, he turns in vain to most of his usual authorities for any guidance as to how such a case is best to be treated. Even in some of the cyclopædias and larger text-books the information contained is rarely of a sufficiently detailed and practical character to be of much assistance to the physician. Yet there can be little doubt that, in view not only of the comparative frequency with which stammering is met amongst patients, but especially of the amount of unhappiness that it occasions to the sufferer, the subject is well worthy of consideration, and that in a practical manner.

It is true that the condition is one upon which the advice of a physician is rarely sought. It is very striking how little attention parents commonly pay to the presence of an impediment in the *speech* of one of their children, as compared with the readiness they show in getting, for example, a slight impairment in their *walking* attended to at once by their medical adviser. They seldom realise how severely handicapped the little sufferer is by his misfortune—well-named an "impediment"—the intensity of the misery, the nervousness and fear of derision so constantly present to him, whether at school or at play.

The aim of the writer in this article will be to discuss as concisely as possible some of the chief points in connection with the subject of stammering, but especially to indicate in as practical and detailed a manner as possible the method of treatment advocated by Prof. Wyllie, which the writer has repeatedly found to be eminently satisfactory. One of the great advantages of Wyllie's system (full details of which will

be found in his work on *Disorders*[1] *of Speech*) is that the treatment can be easily explained and carried out by the patient's ordinary medical adviser; hence its importance for the general practitioner.

*Definition.*—In this country the words stammering and stuttering are frequently used as practically synonymous, thus differing from the German teaching. Occasionally writers have used the word stammering to include all varieties of *developmental* defect of utterance (*e.g.* lisping, lalling, &c.), but in this article the term stammering will be taken in its more restricted sense, as denoting "a functional affection of speech, characterised by a tendency to a sudden check in the utterance of certain syllables or letter-sounds." In some cases there is a further tendency to the rapidly recurring enunciation of the particular letter-sound, in connection with which the difficulty of utterance has arisen; and it is to this condition that the term "stuttering" is best applied. The word stammerer is thus used in this article as the generic term, and includes the two chief groups of patients, (*a*) those who "stutter" at certain letters, and (*b*) those who (to use Wyllie's phrase) "silently stick" in the utterance of the desired word or syllable.

*Ætiology.*—As regards the ætiology of stammering, much has been written, but it is not necessary here to deal with it at any length. One of the most striking features is the influence of *sex*, boys being much more frequently affected than girls.

*Age* is another important factor, stammering being rarely (if ever) acquired after the second decade. It is worthy of notice, however, that very commonly the period of onset is not when speech is being first acquired, but rather in the later years of childhood.

It is doubtful if *Heredity* really plays an important part in its causation. Cases which have been described as hereditary are probably more accurately to be ascribed to another—perhaps the most important—factor in the ætiology of the condition, viz., *Imitation* of another stammerer. This may be consciously or unconsciously done; and there can be little doubt that it is unconscious imitation that is largely at work in

[1] *The Disorders of Speech.* By John Wyllie, M.D., F.R.C.P.E. Oliver and Boyd, Edinburgh.

cases which have been described as hereditary, rather than any actual transmitted functional defect of speech.

Stammering is so frequently imitative that the possibility of other children acquiring the habit from imitation of a companion (*e.g.*, at school) is a point for serious consideration in connection with the preventive treatment of the condition.

Stammering is stated by some writers to have come on after debilitating illnesses, *e.g.*, prolonged fevers; and it is certainly true that, in many cases, the patient stammers worse when his general health is below par.

One undoubtedly important factor in making the patient worse is the nervousness and sense of publicity present in answering questions, for example, in a school class.

It is sometimes said that stammering is especially apt to occur in persons of a shy, sensitive, and nervous temperament; but in most cases the nervousness is the result rather than the cause of the condition.

*Symptoms.*—The symptoms of stammering are too well known to call for any detailed notice here, but one or two points must be referred to. As stated above, the writer follows Wyllie's classification of stammerers into two groups—those who "stutter" and those who "silently stick."

In the first variety—probably the less common of the two—there is not merely a sudden interruption in the patient's utterance, but the literal sound in connection with which the difficulty of utterance has arisen—commonly one of the explosive consonants—is rapidly repeated before the ensuing vowel is enunciated, *e.g.*,"p–p–poor B–Bob." It may frequently be observed in these cases that the patient is emptying his chest too rapidly of air, so that the end of his sentence is often barely audible owing to the deficient volume of air passing through his larynx. This "stuttering" variety, however, is perhaps more frequently met with on the theatrical stage than in real life.

In the second and commoner variety there is much less *audibly* noticeable to the bystander in the way of stammering, a fact which explains why this variety is scarcely ever introduced upon the stage. For in many of the less severe cases it is only by looking at the patient that the fact of his stammering can be noticed at all. To the ear it may sound only as if the speaker

was grouping his words peculiarly, whereas the actual condition is that his utterance of words is involuntarily checked at intervals, owing to his "silently sticking" at certain letters. As Wyllie aptly puts it, this variety of stammerer produces, *e.g.*, in saying the word "poor," one big initial "capital P," instead of the stutterer's several little "p"s!

But while there is thus little detectable by the ear in this commoner variety, there are other symptoms which are often not only noticeable, but distressing to witness. The patient frequently becomes congested in the face; and his cheeks puff out in his ill-directed attempts to give utterance to the "bottled up" sound, which is not unfrequently "spluttered out" with an explosion of saliva as well as air. In many of the severer varieties involuntary contractions of the facial muscles, resulting in unsightly grimaces, occur from an overflow of the misdirected energy; and jerking movements of the head, or even of the limbs, may be produced, so that the patient frequently appears exhausted by his exertions in overcoming his difficulties.

It is well to distinguish between these involuntary movements and others of a *purposive* kind which may be noticed in certain patients. Thus it occasionally happens that the impediment is more easily overcome if the stammerer throws some other muscles into play, *e.g.*, by tapping one foot, or swaying the body, &c.; and the patient, having either found this out for himself, or having been taught such a method by one of the many "stammer-curers," makes use of this help in overcoming his obstacle.

Another variety of voluntary action on the part of the patient, to aid him in his difficulties, is sometimes met with. Thus the word which occasions the interruption in utterance can sometimes be more readily pronounced during *inspiration* than in expiration, so that the patient in speaking sucks in, as it were, the difficult word, producing thereby a peculiar see-saw mode of speech. This, it should be noted, is a voluntary action primarily, although from habit it may become involuntary.

It should be specially noted that patients are much more apt to stammer upon letters occurring at the *beginning* than in the middle of a word; that the condition is usually most marked when they are speaking in their ordinary conversational

tone; and, further, that it is practically never present when the patient sings.

*Pathology.*—Stammering, as we shall endeavour to show, being essentially a functional affliction—the result of a want of harmony in the working of the complex mechanism concerned in the production of speech—there are no pathological lesions associated with the condition. There is no need, therefore, to consider here the bygone teaching, which sought the source of a patient's stammering in the anatomical condition of his oral mechanism, especially of his tongue. The condition is inherently the consequence of the faulty working of a complicated machine rather than of any defect of structure.

*Treatment.*—In the treatment of stammering it is of the utmost importance that the patient should thoroughly understand the method of production of normal speech. It is only when this has been carefully explained to him, that the proper method of overcoming his defective speech-production can be satisfactorily grasped. It must be clearly explained to the pupil at the outset, therefore, that the physiological production of normal articulate speech is the result of the concerted action of three separate, but closely co-ordinated, mechanisms:—(1) A current of air must be expelled from the lungs by the ordinary expiratory apparatus; (2) this column of air passing through the larynx produces vibrations of the vocal chords, which result in certain sounds ("vocalisation"); and (3) these sounds, initiated in the larynx, are capable of various modifications ("articulation") by the actions of the lips, tongue, palate, &c.[1]

Now while the importance of the expiratory function is undoubtedly great—the necessity of speaking from a full chest will be subsequently alluded to—the important fact for the stammerer to understand is this—that his difficulty arises from a *want of the proper harmony or prompt coöperation between the functions of vocalisation and articulation.* It has been well pointed out[2] that the feature which usually "obtrudes itself upon the stammerer's attention is the difficulty of performing the necessary movements of the tongue and lips, but the

[1] It should be noticed that in the formation of certain letters (as will be afterwards alluded to) only the respiratory and articulatory mechanisms take part, there being no laryngeal element present, such letters being aptly enough described as "voiceless."

[2] Clifford Allbutt's *System of Medicine*, Vol. VII., p. 449.

essential difficulty consists in securing proper coördination between the vocal and articulatory mechanisms."

For the purpose of making this clear to a lay pupil, Wyllie's simile of a violin-player can hardly be improved upon. He points out that just as, in playing a violin, one hand (the "bow-hand") *produces* the sounds and the other (the "string-hand") modifies these into music, so in the production of speech, vocalisation represents the "bow-hand" and articulation the "string-hand." Now the stammerer's error, in the great majority of cases, lies in the fact that his vocalisation is defective both in promptitude and amount; and he seeks to make up for this defect by excessive attempts at articulation. Just as a violinist would utterly fail to produce any sound from his instrument, if he neglected the "bow-hand" and threw his misdirected energy into his "string-hand," so the stammerer, neglecting his vocalisation, and trying by excessive efforts at articulation to produce the words, inevitably "stutters," or "silently sticks." In other words, the patient stammers *because he is giving more attention to articulation than to vocalisation;* and the chief aim in treatment is to bring out and emphasise, wherever possible, the *vocal* element in words.

The practical importance of this emphasising of the vocal element in the obviation of stammering becomes strikingly evident, when it is remembered that scarcely ever does a patient stammer in singing. In singing, his attention must be directed to the proper vocalisation of the words; and consequently the articulation of them—even those with the most troublesome voiceless explosive consonants—occasions no difficulty.

Similarly, when speaking or reading in a monotone (as in church services), the predominance of the vocal element will enable a stammerer to overcome his articulatory trouble. Thus Wyllie refers to the well-known fact that Charles Kingsley, though he stammered badly in ordinary conversation all his life, was enabled to preach well by adopting a style of musical monotone in his delivery.

Another striking instance has frequently been observed by the writer of the practical value of emphasis of the vocal element in thus overcoming any difficult word. He has found that, if the stammerer adopts the "voice" or "tone" of some-

one familiar to him, he can get over his most troublesome stumbling-blocks with the greatest ease. His attention is so directed to producing accurately the correct *sound*, that the *articulation* of difficult letters is as easy as it is in singing. The practical value of this little subterfuge is all the greater in view of the fact that it is especially with strangers (who are not familiar with his natural voice) that the stammerer is apt to be at his worst; and should he be asked suddenly to read aloud before strangers there is no reason why he should not adopt this method of overcoming his difficulty, at least in the earlier stages, as it is more successful and less noticeable than "intoning." Of course this faculty of imitation of the voice of another is not possessed by all stammerers, but it is, to those who have it, an asset of no little value.

## A Physiological Alphabet (Wyllie).

I.—Vowels.

Y—I E A O U—W.

These should be pronounced in the Latin manner as $\bar{e}\bar{e}$, eh, ah, oh, $\bar{o}\bar{o}$; y and w are consonants, not vowels, but are placed here for reasons given in the text.

II.—Consonants.

| —— | Voiceless Oral. | Voiced Oral. | Voiced Nasal Resonants. |
|---|---|---|---|
| Labials (First stop-position). | P (W) | B W | M |
| Labio-Dentals | F | V | |
| Linguo Dentals | $Th^1$ S | $Th^2$ Z | |
| Anterior Linguo-Palatals. (Second stop-position.) | Sh T (L) | Zh D L R | N |
| Posterior Linguo-Palatals, (Third stop-position.) | K H or Ch | G Y (R) | Ng |

The voiceless W and voiceless L have been given in brackets, the former being now almost confined to Scotland, the latter being peculiar to Wales. The uvular (burring) R is also in brackets.

When once the pupil has thoroughly grasped the fact that his difficulty arises from a want of the proper coöperation between his vocalisation and articulation in speaking, he should be taught how, in the light of this fact, to deal with the various letters of the alphabet. Now a cursory consideration of the English alphabet will reveal the fact that it contains several redundant letter-sounds ; and for the instruction of stammerers such a Physiological Alphabet as that constructed by Prof. Wyllie (which is here reproduced from his work by his kind permission) is of the greatest value.

In considering the more important features of this alphabet, it will be well to take it in divisions, beginning with the vowels.

## I.—Vowels.

All the vowels are, of course, produced in the larynx, and being thus full of "voice," they generally cause little trouble to the stammerer. He should, however, be instructed to give full vocal emphasis to each of them in speaking ; and for the purpose of practising their proper Latin sounds, Wyllie's illustrative sentence is a very convenient aid, producing as it does each of the vowels in the physiological order in which they are produced in the oral mechanism :—"Eels ail amid ocean ooze." It will be noticed, however, that the letters W and Y are grouped by Wyllie along with the vowels. Now this is a point of very great practical importance, for these two letters, when they occur as initials, are frequently a source of the greatest difficulty to stammerers. The patient generally attempts to produce these consonants without vocalising them, the air escaping fruitlessly from the lips. Now Wyllie points out that an initial W is phonetically equivalent "to a tight $\overline{oo}$, with a slight fricative element added," as, for example, in the word "water," which is phonetically "$\overline{oo}$–ater." Similarly an initial Y really represents $\overline{ee}$ ; thus the word "yard" might be phonetically spelt "$\overline{ee}$–ard." The common word "Yes" frequently presents a great difficulty to a stammerer, partly perhaps because it so often stands alone in conversation, but mainly because of his attempts to pronounce the initial letter voicelessly as "Yeh." When once he is made distinctly to grasp the fact that, phonetically, the word is equivalent to "$\overline{ee}$-es," and that in conversation it should be pronounced

almost as if one was "spelling it out" into two syllables, he will find he has not only mastered this difficulty, but that he has got the key to the enunciation of a large number of hitherto extremely troublesome words. All words, therefore, having an initial Y are to be pronounced as though they began with $\overline{ee}$; while similarly all words commencing with W are to be pronounced as if they began with $\overline{oo}$. The letters W and Y may thus, as Wyllie says, be regarded as "stepping-stones between vowels and consonants."

## II.—Consonants.

Each consonant is considered here "as it is pronounced during the enunciation of a syllable containing it," *e.g.*, the letter F is regarded not as "eff" but as the initial sound as in the word "far."

It will be noticed that in the Physiological Alphabet they are grouped according as they possess, or are devoid of, "voice." This is the main feature of importance in the alphabet so far as the treatment of stammering is concerned. The horizontal grouping of the letters, though of great practical importance in other respects, does not specially concern us here.

Now the great primary guiding rule which Wyllie lays down may be summarised, thus:—

*In speaking or reading all consonants which normally contain voice should have their full vocal element given to them; while those which are normally voiceless are to be touched off as lightly as possible, the voice being brough out with emphasis in the ensuing vowel or voiced consonant.* Thus, in saying "Tom Davidson" the voiceless "T" is scarcely to be pronounced at all, there being merely sufficient compression of the air to give to the fully resounding "om" the explosive character of the initial voiceless T. If the phrase may be permitted, it is not a "great big T" which is to be manufactured (as is so apt to be the case with stammerers), but the smallest possible T that will suffice to initiate the succeeding vocalised fragment of the word. On the other hand, since D requires "voice" for its proper pronunciation—being, in fact (as the teacher and pupil can easily verify for themselves), the letter T with voice added—the initial letter must have the voice boldly thrown into it and even emphasised, almost as if it were pronounced

"ud-avidson." Thus the voiceless initial is to be merely formed, as it were, but not sounded, in contrast to the voiced D, which is to have its vocal element almost exaggerated.

It is of the utmost importance that the pupil should thoroughly grasp this vital distinction between the two classes of consonants; no mere learning by rote of the columns of consonants in the alphabet as "voiced oral," "voiceless oral," &c., will suffice. He must be made to *prove* to himself (by experiment in the presence of his teacher) the fact that certain consonants essentially possess "voice" in themselves, while others are, just as distinctly, normally devoid of "voice"; so much so, indeed, that the intrusion of the voiced element into a voiceless consonant converts it into quite another letter. Thus P with "voice" thrown into it inevitably becomes B, and similarly D, V, Z, and G (hard) are precisely the "voiced" equivalents of T, F, S, and K. It is often useful, therefore, in order to familiarise the pupil with the distinction between the treatment by the stammerer of the voiceless and the voiced letters in a word, to give him sentences and ask him to underline the letter in each word on which the voice is *first* to be thrown, thus:—"*A*sk K*a*te t*o* c*a*rry *b*ack *m*y t*a*rtan sh*a*wl." When the pupil is reading his lessons, the teacher should carefully watch to see that he not only does thus emphasise the voiced consonants (and vowels), but that he also reduces to the smallest possible size, as it were, the voiceless letters when they form the initials of words.

In connection with this point, it is of some interest to note that (as the writer has pointed out elsewhere[1]) in any case where the pupil "sticks" at a word, the teacher should be able to tell, from merely listening, whether the letter that he is trying to produce is "voiced" or not. For if the patient is giving, as he ought, the full vocal element to all the voiced consonants, the preliminary laryngeal sound should be audible in their production. Thus, in saying "Poor Tom Bowling," no sound is audible during the formation of the initial letter of the first two words; the explosive character of the ensuing vowel is being silently prepared, so that no one could tell what the pupil was going to say. But in producing the last word, he

[1] *Brit. Med. Journ.*, July 20, 1901, p. 31.

should give audible evidence that a voiced letter is about to issue, almost as if it were spelt (phonetically) "ub-owling."

Having got this all-important principle, therefore, firmly stamped upon the pupil's mind, the teacher should then go over with him the various letters of the Physiological Alphabet *seriatim*, making him practise them repeatedly, so as to convince himself of the presence or absence of voice, as the case may be. It is not necessary to refer in detail here to each of the letters, but a few notes upon certain points may be of use, and these will be best given under the three headings :—

(1.) *Voiceless Oral Consonants.*—In the production of each of these the general guiding rule must be borne in mind, viz., that as far as possible these letters should be no more than *formed* in the oral mechanism, all the emphasis being thrown into the ensuing "voiced" letter, so that the voiceless consonant, when it occurs as the initial letter of a word, should merely give a shape or mould to the sound about to issue. It is a little difficult to explain in a written article how this is to be carried out ; a *vivâ-voce* illustration to the pupil is much simpler. A voiceless initial should only lead up to the ensuing vowel, but in no way whatever attempt to dominate the word. In the earlier stages of treatment the following method of teaching the pupil how such voiceless initials are to be touched off will be found useful. Take such a sentence as "Peter caught ten fish," and let him first practise emphasising the voiced portions of the words, viz., "*e*ter, *au*ght, *e*n, *i*sh." Having thus got the essential part of the word fully produced it is not difficult to let him understand that the very smallest possible "P" will suffice to convert the "eter" into "Peter." The initial scarcely requires to be pronounced at all. In producing the "P" the lips should not be tightly pursed, as is so often the case with stammerers, but merely momentarily apposed and then instantly opened for the escape of the vocalised fragment "eter," which has been given ample "clothing," so to speak, for its conversion. In similar fashion, if the voiced part ("aught") of the next word be repeated over frequently, and the voiceless "C hard" or "K" be then, as it were, slipped into its place as the initial letter, he will find that a very slight and momentary apposition of the tongue to the

palate will give all the change to the resounding fragment that is required to convert it into the complete word "caught."

The same lesson applies exactly to the production of the other voiceless consonants, but a point of some little practical value may be mentioned in connection with the next word in the sample sentence. It is a well-known fact that it is especially when they occur as *initials* that the voiceless consonants prove a source of difficulty to stammerers. Now if this word "ten" stood by itself, or as the first word of a sentence, the initial "t" should be dealt with exactly as the initial P in "Peter." But it should be noted that the immediately preceding word—"caught"—had "t" as its terminal letter. Hence this voiceless letter having just issued from the pupil's lips, there is no need to reproduce it again for the word "ten"; the vocalised fragment "en" should be tacked on, as it were, to the end of the preceding word, as if the spoken sentence ran "Peter caught-en fish," no pause, of course, being allowed to occur at the end of the word "caught."

This simple procedure will often be found of considerable service to pupils who may adopt it as a general working rule, viz.:—"*where the voiceless initial of any word in a sentence is the terminal letter of the immediately preceding word, no attempt should be made to reproduce it again as an initial.*" In other words, the practice of "touching off lightly" all voiceless initials is here carried to the utmost possible extent, the voiceless initial being practically omitted.

As regards the letters classed as "voiceless oral consonants" by Wyllie, the pupil must learn to distinguish between the production of the (voiceless) th[1] in "thin" and the voiced equivalent in "thine." The letter K represents, of course, "C hard" as well as itself, just as S represents "C soft" as in the word "city." Hence the absence of the letter C itself from the alphabet.

As regards the aspirate H a diversity of opinion prevails amongst writers on this subject; but there is certainly much in favour of Wyllie's view, that it is a "voiceless fricative of the posterior stop-position." Thus if the pronunciation of the word "He" is carefully analysed, it will be found that the tongue is peculiarly apposed to the palate during the fricative escape of the voiceless air. In fact, as Wyllie points out, an

initial H is closely analogous to the terminal soft "ch" in the word "loch" as pronounced by a Scot.

(2.) *Voiced Oral Consonants.*—The essential need for the full vocalising of each of these by the stammerer has already been insisted upon, but particular attention may be directed to certain of the letters. Thus the mode in which the pupil is to deal with W has already been mentioned under the vowels, but an important practical point may be referred to at this stage. It will be found, as a general rule, that all words which commence with *two or more* consonants are especially apt to cause difficulty to stammerers, as if the combination of the two consonantal sounds—(frequently one voiceless and the other voiced)—overtaxed the already defective "gearing" of the vocal articulatory mechanism. In this respect words commencing with "wh" are no exception, and these occur so frequently in conversation, that it may be well to indicate how the difficulty is to be surmounted. As stated previously, the "w" is to be treated as a vowel, and therefore fully vocalised, as practically equivalent to "o͞o"; but the pupil should also note that, phonetically, the "h" *precedes* the "w," so that "which," "what," &c. are to be pronounced as if they were phonetically spelt "hoo͞-ich," "hoo͞-awt," &c. Nothing is commoner amongst stammerers than the attempt to pronounce the initial "wh" voicelessly, with almost certain difficulty as a result; but let the pupil fully vocalise the o͞o sound of the "w" (making almost two syllables of the word "which" in his pronunciation of it) and he will then experience no difficulty. Similarly, words commencing with "sw," which often prove very troublesome to stammerers, will become comparatively easy if the "w" is again treated as equivalent to o͞o; *e.g.*, "sweet" becomes phonetically "so͞o-eet."

The compound letter-sound "zh," which Wyllie inserts, never occurs, of course, as an initial, but it is the phonetic equivalent of the letter "s" as it is pronounced, for example, in the word "mea*s*ure."

L and R are both letters that frequently prove stumbling-blocks to a stammerer. They are produced by a peculiar trilling or fricative action of part of the tongue,—in the one case of its sides, in the other of its tip. But, as is so often the case, it is on this articulatory feature of the letter that

the stammerer concentrates his attention, while he neglects altogether the primary and essential vocal element that is present in each of them. They are are both *voiced fricative* letters; and the pupil must be taught to vocalise them thoroughly from a full chest, instead of attempting to pronounce them altogether voicelessly or with only a feeble intermittent hum.

(3.)—*Voiced Nasal Resonants.*—The only two letters that concern us here are M and N, since "ng" never occurs as an initial; and the same remarks apply to their production as were made regarding L and R. The pupil constantly attempts to pronounce these letters (as initials) voicelessly, and just as certainly finds them give rise to difficulty. The teacher must therefore insist on his vocalising each of them as much as possible, so that a loud continuous hum is produced, almost as if such a word as "Newmarket" were spelt phonetically "(um)new" "(um)-market." The teacher must pay special heed to see that each initial "m" and "n" in the patient's speaking or reading is thus accompanied (or even heralded) by a distinct vocal hum.

Before passing from the consideration of the Physiological Alphabet some allusion may be made to the absence from it of certain letters. The absence of C has already been explained; Q is phonetically equivalent to "kw," and similarly X is represented by "ks," as is clearly shown by the identical pronunciation of "Styx" and "sticks." The only letter calling for further notice is J. Wyllie has well pointed out that this is really a compound letter-sound, being equivalent to "dzh"; thus "Jim" may be phonetically spelt "dzhim." The letter G when "soft" represents exactly the same sound, as is shown in the word "gin," which is phonetically "dzhin." The pupil must have strongly impressed upon him the existence of the fully-voiced letter "d" as the really primary letter-sound in all words commencing with J or G "soft," and the absolute need therefore for the fullest vocalising of this initial. It is of interest to note that, as Wyllie points out, there is a voiceless equivalent of this compound letter-sound, viz., the soft "ch," as in the word "chin," which is phonetically "tshin."

Most of the chief difficulties which occur amongst stammerers having been alluded to in the consideration of the individual

letters of the alphabet, and practical methods of obviating or overcoming these having been described, it will be well now to summarise the more important points to be borne in mind in undertaking the treatment of a pupil.

It will be well at the outset for the physician to notice what are the letters at which the pupil especially tends to stumble in his ordinary conversation, and in the great majority of instances the stammer will be found to present the type described above, viz., a lack of efficient and prompt vocalisation of the voiced consonants, coupled with a tendency to exaggerated attempts at articulation of the voiceless explosives.

The first essential is to make perfectly clear to the pupil the *twofold* nature of the process concerned in speech-production, viz., vocalisation and articulation; and even young patients can be got to understand this physiological fact, if Wyllie's illustration of the violin-player be put graphically to them. Only a little explanation will then be required to show them wherein their chief difficulty lies, viz., a lack of promptitude and sufficiency in the supply of the vocal element of letters. In gaining their confidence it is important to prove this to them by pointing out their ability to sing words which they inevitably stumble at in ordinary conversation. If the pupil be so devoid of a "musical ear" as to be unable to sing, he may be able to follow the suggestion of the writer that he should adopt the tone or voice of someone familiar to him, which will demonstrate to him equally well the all-important part in the treatment of his condition to be played by the emphasising of the vocal element in speaking. He must be further shown that no amount of excessive efforts at articulation can ever make up for lack of vocalisation, and that in conversation his whole attention should be directed to the vocalisation of letters wherever possible. Wyllie's alphabet should then be given to him, and its essential features most carefully explained by his teacher. There is no need here to recapitulate what has already been detailed so fully under this heading, but it cannot be too strongly urged that the pupil must be made to *prove to himself* the existence or absence of voice in the various letters. This is the real key to the patient's difficulty, and he must therefore make himself so familiar with it that he can at once point out in any given sentence the first letter

in each word in which "voice" is contained. In order to fix the voiceless and voiced letters respectively upon the pupil's mind, he should be made to learn such a set of sentences as that drawn up by Prof. Wyllie and inserted here by his kind sanction. They are specially devised for use in the treatment of stammering, reproducing as they do the consonants in groups according as they are voiced or voiceless :—

A.—*Initials that contain voice.* (In the pronunciation of these the voice is to be thrown boldly into the initial) :—

1. "Even ancient elves are awed over oozing."
2. "We visit the Zulus like ramblers yearly."
3. "My nephew."
4. "Best gold dust."

B.—*Initials that do not contain voice.* (These are to be touched off lightly, the voice being promptly brought out in the ensuing vowel or voiced consonant) :—

1. "Far shores seem thinly hazy."
2. "Two poor comrades."

For further exercise upon the more difficult initials the following additional sentences are also reproduced :—

A.—*Voiced Initials* :—

1. "Billy Button bought a buttered biscuit."
2. "Davy Doldrum dreamt he drove a dragon."
3. "Gaffer Gilpin got a goose and gander."
4. "Mother, make more mustard : no, no, not now."

B.—*Voiceless Initials* :—

1. "Peter Piper picked a peck of pepper."
2. "Tiptoe Tommy turned a Turk for twopence."
3. "Kimbo Kemball kicked his kinsman's kettle."

The teacher should notice what letters cause the greatest difficulty to the pupil in the reading of these sentences, and numerous similar sentences containing these difficult letters should be drawn up and systematically practised daily by the pupil. Until the patient has got quite familiar with the distinction between the treatment of the voiceless and the voiced consonants, it is advisable to have each sentence so constructed that it will contain only voiced or voiceless initials,

in order that he may not be confused by the sudden change required in the method of producing them correctly. But subsequently he should be given sentences containing initial letters of dissimilar character, so that he may acquire the habit of instantly emphasising the voiced letters and lightly touching off those that are voiceless.

Special attention should be directed to explaining the proper physiological method of pronouncing the more difficult letters, *e.g.*, the nasal resonants, L, R, and J, in the pronunciation of which nearly all stammerers tend to omit altogether the essential vocal element. It will be well at first to get the pupil, when reading, so to emphasise the voiced initials that the teacher can detect (as noted above) by the ear alone (*i.e.*, without knowing what word is coming) the approach of a word with such an initial as D, B, J, M, &c. by the presence of the audible initiatory laryngeal sound, which is an essential part of all voiced letters. The proper method of overcoming the very common difficulty arising from an initial Y has been fully enough described already, but pains should be taken to ensure that the pupil always adopts the voiced "ēē" instead of the voiceless "yeh"; and the same care is necessary in getting him to remember the "semi-vowel" pronunciation of an initial "w." The initiatory laryngeal "ōō" sound must always be loudly emphasised, so that he may avoid that fruitless escape of the air from the lips which can readily be felt to occur in cases where a stammerer is attempting to produce voicelessly an initial W. Thus, such a sentence as, "Will you walk back yonder?" must be pronounced by him as if it spelt, "ōō-ill ēē-ou ōō-alk (ub)-ack ēē-onder?"

The writer has already alluded to the difficulty which commonly arises when a word commences with two consonants, but a few additional notes on the point may be of service. When the initial letter is voiceless and the succeeding consonant is voiced—as in such words as "prim," "flight," &c.—the stammerer will get over his difficulty without much trouble if he firstly practises the emphasising of the voiced portion of the word, viz., "rim," "light," and then prefixes almost inaudibly, as it were, the voiceless initial as described above under the voiceless consonants. Should there be more than one voiceless consonant preceding the vocalised fragment of the word, as in

strong" and all words commencing with "st," he must endeavour to interpolate these with the "lightest possible touch," so to speak, bringing out the full vocal emphasis in the ensuing fragments.

On the other hand, when both the primary initial and the succeeding consonant are voiced, as in words beginning with "gr," "gl," "dr," &c., the voice must be very fully thrown into the primary initial consonant, for the stammerer is very apt to pronounce this voicelessly. When once the initial letter has been fully vocalised the remainder of the word often presents little difficulty, containing as it frequently does voice in every letter, *e.g.*, "glide," "ground," "dream," &c. Should the stammerer, however, find special difficulty with this variety of word, it is often advisable, in the early stages of treatment at least, to get him so to emphasise the vocal element in the initial consonant as almost to convert it into an extra syllable, as if the words "glide," "drown," were phonetically pronounced thus—"(u)g-lide," "(u)d-rown)," &c.

The patient in all his lessons—those practised at home, as well as those gone over with his teacher—should *stand up* and speak out in a full (not necessarily loud) voice, in order that he may be able to give vent with ample emphasis to the vocalised letter-sounds. Further, in both speaking and reading, he should endeavour to follow Wyllie's suggestion of "making music with the voice, and *listening* to it as he speaks." The nearer he approaches to the adoption of a rich musical tone in conversation and in reading, the more readily will he master his former difficulties.

He must also cultivate the habit of taking full inspirations at regular intervals, so that he may always have ample air at his command for the full vocalisation of every voiced letter in each sentence. Lack of proper control of his breathing is a very common defect with the stammerer, and any exercises that improve both his respiratory capacity and his control over the exit of air from his larynx will be found in many cases to be most advantageous. It is almost needless to say that he must always avoid speaking abruptly or hurriedly, cultivating instead the habit of deliberate (but musical) utterance.

The pupil should commence every daily lesson with the reading of the stammerer's sentences given above, proceeding

then to additional sentences drawn up by himself, containing exercises upon the consonants which cause him the greatest difficulty. He should then have a short reading lesson in poetry — preferably blank verse — and afterwards proceed to prose. It is of the utmost importance that his lessons be faithfully carried out *daily* and *with persistence.* It has been well said that as regards treatment stammerers may be classified as those who are eager to get cured and those who are indifferent about their lot. The latter class it is extremely difficult to improve, for one of the most important factors in obtaining a cure is the patient's determination to master his impediment. But those stammerers who are in earnest in their desire to get over their difficulty, and are willing to take pains, should be able to find in their own medical adviser a guide and teacher who can hold out the strongest hopes of effecting a cure by the adoption of, and patient perseverance in, such a system of training as has been described above. The writer does not pretend that the cure of such a deep-rooted (though functional) affection is easy, but the chief element of difficulty lies, not in making the pupil understand the treatment, but in getting him to persevere steadily in it.

As regards the *age* at which treatment should be commenced, no definite rule can be laid down. It entirely depends upon the aptitude of the particular patient. It is not difficult to get even young patients to grasp the main principle of the production of speech by the help of Wyllie's simile; but the really important question is whether the pupil is in earnest and willing to persevere in his course of treatment. This, of course, is not so much a question of the patient's age as of his personal characteristics.

*Prophylaxis.*—One other point in treatment remains for consideration viz. : — the question whether a patient who stammers badly should be educated along with other boys, as in a public school. There can be little doubt that there is a distinct risk of other scholars—especially those who are younger—acquiring by imitation the same functional affection. On the other hand his being amongst a crowd of class-fellows is far from conducive to the stammerer's happiness or well-being, and still less to the improvement of his impediment; for the publicity of his awkward attempts at articulation and

the frequent necessity, in much of the class teaching, for prompt and *hurried* answering alike tend to increase his stammer and his nervousness. The result only too often is that the patient finally makes no attempts at replying to his teacher, becoming shy or even morbidly quiet and silent; or he may acquire some of those more exaggerated movements adopted occasionally by extreme stammerers in their attempts to ejaculate a difficult word. It is almost impossible to get a pupil, in his *vivâ-voce* work at school, to follow out the lessons prescribed by his medical adviser for physiologically overcoming his defective utterance. If the repeating of his daily lessons at school, therefore, is largely to undo the good result of the teaching of his medical attendant at home, it will probably be much better for the patient (and also for his class-mates) that he should be taken from school and placed for a time under the care of a tutor, who, in continuing his general education, can at the same time follow out the instructions of the medical adviser on the above lines. This has the further advantage that it ensures the pupil's persistently carrying out, under supervision, the proper physiological treatment of his condition.

# A CASE OF GASTRIC DILATATION AND TETANY. RECOVERY.

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During the past winter session, in the wards of Professor Greenfield in the Edinburgh Royal Infirmary, I had under my care, as Resident Physician, a case of Gastric Dilatation, in which there occurred during the patient's stay in hospital several severe attacks of that interesting and, in many cases, fatal complication, Tetany or Tetanoid Spasm. The comparative rarity and seriousness of the condition make the case one worthy of record.

The patient, J. B., a married man, 47 years of age, was a tailor by occupation, and was sent to the wards as a case of Gastroptosis, a condition which on examination resolved itself into one of Dilatation of the Stomach, the upper limit of that organ being situated in practically its normal position. He was admitted to hospital on October 3rd, 1901.

*Present Attack of Illness.*—This was one of a series of four or five of a similar nature, and began three months before admission. The first attack had occurred 16 or 17 years previously, when he was about 30 years of age, and the last attack some two years ago. None of these had been accompanied by tetanoid complications.

On the present occasion his illness commenced with a sensation of general discomfort. His food did not agree with him, his meals being followed by a feeling of uneasiness and distension in the region of the stomach, heartburn, and eructations of very large quantities of foul-smelling gas. Later he became subject to severe attacks of gastric pain, supervening usually about two, or two and a half, hours after food, and relieved only by vomiting. For the last three months the patient had been washing out his stomach almost daily, but nevertheless he was falling off so rapidly in weight and strength that work became impossible, and he had frequently to take to bed.

*Previous Illnesses.*—When 21 years of age patient had a severe attack of "Inflammation of the Bowels," and at 24 he suffered from Scarlet Fever. There was no history of Venereal Disease.

*Previous Conditions of Life.*—Patient had followed the occupation of a tailor for thirty-four years, usually in close, dusty, overcrowded, and badly-ventilated workrooms, sometimes working for 16 or 18 hours at a stretch, with insufficient intervals for food. His meals were regular and very light, usually consisting of bread and tea. (Breakfast, 8 a.m.—porridge and milk. Dinner, 1 p.m.—Rice, or a cup of tea and bread. Tea, 6 or 7 p.m.—tea and dry bread. Supper, none.) His home conditions were satisfactory, and he used alcohol and tobacco only in moderation.

*Family History.*—Father, aged 70, is living and healthy. Mother died while patient was a boy, cause unknown. He had two brothers, one of whom died in infancy, and the other succumbed to an attack of scarlet fever and nephritis at the age of 10. A sister, aged 12, also died from renal complications following scarlet fever; another sister died in infancy, while a third is alive and well. Patient was the eldest of the family. He had had eight children, three of whom died in infancy, the others being alive and healthy. There was no history of gastric or nervous disease among his relatives.

*State on Admission.*—Height, 5 ft. 3¾ in. Weight on admission, 6 stone 8¼ lb. Four years ago he weighed 7 stone 13 lb. The patient was a small, thin, poorly-developed man, pale and anxious-looking, intelligent, and somewhat emotional, and apparently very ill. His temperature varied from 96° to 98° F. His pulse was very variable in rate (52 to 108), usually averaging about 60 or 70. The respirations were from 18 to 24 a minute. The tongue was pale, flabby, and tremulous, and covered with slight white fur. The pupils were of medium size, equal and circular; they reacted readily to light, and for accommodation.

His appetite was usually very poor. Occasionally he felt very hungry, but if he took more food than usual his symptoms became much aggravated, and he obtained no relief until he vomited. After meals he suffered from a feeling of weight and distension; and in from two to two and a half hours after ingestion of food considerable and often very severe gastric

pain supervened, accompanied by frequent eructations, heart-burn, and waterbrash, and followed almost invariably by the vomiting of a large quantity of pale-brownish beer-like fluid with a brown froth. On the day after admission the vomit was examined by my colleague, Dr. Andrew Hunter. It was thin, watery, and almost colourless, with a slight acetous odour. The reaction was acid, free hydrochloric acid, but no lactic or butyric acids being found. It contained no blood or suspicious cells; a few sarcinæ were present, but no torulæ or bacteria were observed.

The patient had suffered from habitual constipation. Usually the bowels moved three times a week, but frequently he had no motion for six or seven days, in spite of the fact that he had been in the habit of taking cascara and other purgatives. Occasionally, however, he had attacks of diarrhœa of considerable severity.

The lips and gums were pale. The teeth were in very good condition.

Inspection of the abdomen showed marked fulness in the umbilical, the left lumbar, and the left half of the hypogastric regions, due apparently to accumulation of fæces. At this time no peristaltic movements were visible.

On palpation, the abdominal walls were thin and fairly firm, and on pressing deeply towards the right margin of the epigastric region, a small, firm, rounded mass could be felt. It moved up and down on deep respiration, and could be moved freely under the fingers against the right side of the bodies of the vertebræ, causing the patient some pain and a peculiar feeling of discomfort. This mass appeared to be about 2 or 2½ inches in diameter, the lower margin being about half an inch above the level of the umbilicus. It could sometimes be felt with comparative ease, but at others it either could only be palpated with difficulty, or its presence could not be definitely made out, pointing probably to a condition of recurring spasm of the pylorus, possibly with some thickening. The patient stated that for some time back he had been able himself to feel this "lump" on pressing deeply in the region indicated.

On percussion the *stomach* was found to be much increased in size, the lower border being one inch below the level of the umbilicus. The organ passed 2 inches to the right of the

middle line, and its vertical diameter in the left mammillary line measured 8 inches, the upper half being tympanitic, and the lower dull, evidently from the contained fluid, as the note on percussion altered with change of position. There was some tenderness on percussion in the centre of the epigastric region.

Succussion was easily performed, and by this method of examination the outline of the stomach could be defined more easily and more accurately than by percussion. There was no enlargement of the liver or spleen.

Occasional palpitation, occurring during the attacks of dyspepsia, was the only subjective symptom noticed. On feeling the radial pulse the wall of the artery was found to be slightly thickened. The pulse-rate was 60; the pulse being slightly irregular in time and force, of small volume and force, and of low tension. The heart was not enlarged. Its sounds, especially the first, were faint in all the areas. There were no murmurs.

The respiratory system was normal. The patient had no cough or expectoration, and the lungs showed no signs of disease.

Micturition was slightly increased in frequency; the patient had usually to rise twice during the night. At the time of examination he was unable to pass water while in the recumbent position, but when allowed to stand he had no difficulty in starting the act, though the stream was small and feeble. The quantity of urine was very variable from day to day, but was usually scanty, the daily amount ranging from 3 or 4 up to 30 or 36 ounces. Its specific gravity was from 1,015 to 1,030; it gave a deposit of phosphates, but contained no albumen or sugar.

On the side of the nervous system there was nothing of note beyond occasional drowsiness, especially after food. The reflexes were not exaggerated.

*Progress of the Case.*—During his first month in hospital the patient presented no other symptoms than those of torpid or atonic dyspepsia, as seen in an ordinary case of dilated stomach. In the first fortnight he improved considerably, gaining slowly but steadily in weight under regular dieting, daily lavage of the stomach, bismuth, rhubarb and soda, and

cascara. Vomiting in the meantime practically ceased, but the action of the bowels remained very irregular, requiring the administration of enemata every other day in order to ensure their action.

On October 5th, two days after admission, visible peristalsis was observed in the neighbourhood of the umbilicus and in the lower half of the abdomen. It was then spasmodic in character, and did not travel in any definite direction, nor did it show any definite pattern; but on October 7th a broad peristaltic wave was seen at frequent intervals in the left hypochondrium and left half of the epigastrium, emerging from under the costal margin, and passing downwards and inwards over the region of the stomach. The resistance in the neighbourhood of the pylorus could be very distinctly felt; and a surgeon was called in to see the case. It was decided, however, not to operate at that time. Towards the end of the month the abdomen became more distended, and a network of veins was observed to be appearing over its lower half.

On October 29th the patient vomited a large quantity of clear, almost colourless, sour-smelling material, containing free hydrochloric acid and sarcinæ. This attack he attributed to the fact that on the previous day he had been feeling comparatively well, though considerably troubled with flatulence, and had consequently taken rather more food than usual.

On November 1st, at 9.30 p.m., it was noted that the patient had been looking very ill for some time. He vomited, and complained of a tingling sensation in the skin of the hands. The vomit was very copious, colourless, acid, and exceedingly sour-smelling; it contained a small amount of blood, and numerous sarcinæ and torulæ. Free hydrochloric acid was present.*

At 1 a.m. on the following morning the patient vomited a large amount of light-brown, sour-smelling fluid, and complained of tingling in his hands and arms. His pulse was rapid (120), small, irregular, and exceedingly feeble; he was very collapsed, and appeared to be almost *in extremis*. Strophanthin, $\frac{1}{120}$ grain, was at once administered hypodermically, and half an ounce of brandy given by the mouth.

* For the various analyses of the vomited matter and stomach contents I am indebted to my colleague, Dr. Hunter.

At 3.30 a.m., suddenly, and apparently without previous nausea, vomiting again occurred, and immediately afterwards both hands became strongly dorsiflexed at the wrists, the fingers and thumbs being held stiff and straight, and slightly flexed at the metacarpo-phalangeal joints, in the so-called "accoucheur's hand" position. The tips of the thumb and index-finger almost touched one another, and the palm of the hand appeared abnormally hollow, owing to spasmodic contraction of the interossei and the muscles of the thenar and hypothenar eminences on either side. After remaining fixed in this position for half a minute or more, slow, twisting, athetosis-like movements of the fingers and hands occurred. The patient became pulseless at the wrist, lying back in bed with his arms held up very much in the position of a dog's fore-limbs when the animal is "begging," the elbows being flexed and closely approximated to the chest wall. The biceps was in powerful contraction, and the triceps muscle was also affected, but to a much less degree. The extensor muscles on the back of the forearm were tensely contracted, their bellies and tendons standing out in marked relief, while the opposing flexors were only very slightly affected at this stage. Presently, however, the forearms became pronated and the wrists were powerfully flexed, the fingers remaining in the same position as before, but the thumbs being now tightly folded into the palms. The feet and legs were not affected, but the muscles of the abdominal wall were somewhat tense. The patient's speech became rapid and incoherent, and he talked a great deal, his words being very indistinct and difficult to make out. He kept repeating that "he was blind and could not see," and complained of terrible pains in his arms during the contractions. This severe attack passed off in five or six minutes, leaving the affected muscles stiff and difficult to move.

At 3.45 a.m. the left arm and hand were again in a state of powerful tonic contraction, the hand being dorsiflexed at the wrist, and the fingers being now over-extended at the metacarpo-phalangeal joints, in the *main-en-griffe* position. The right hand was only slightly affected, the fingers and thumb being held straight from the metacarpo-phalangeal joints, and twisted in different directions. This attack passed off in about seven minutes, the muscles becoming more relaxed, but with

rapid flickering fibrillary twitchings in the extensors of both forearms, much more marked, however, on the left side, as indeed, with one exception, were all the tetanoid manifestations during the patient's illness.

He was now able to speak, though very indistinctly, as if he were unable to move his lips and tongue. He said that his "head was very sore," and that "he felt as if he were getting the battery all over, but especially on the left side of the face, left arm and leg."

A few minutes later his left forearm became tetanically contracted, on this occasion the wrist being flexed, and the thumb strongly bent into the palm of the hand. He several times attempted to speak, but his speech was quite inarticulate. At length, however, he succeeded in muttering the word "pencil" very indistinctly, and during a relaxation of the spasm he pointed to a piece of paper. On being given these he with great difficulty managed to write the word "bissing," and pointed to his left hand. During the attacks of tetany the severe pain in the contracted muscles was considerably eased by kneading them firmly, and at the same time continuously moving the joints affected by the spasm, the action of which it required considerable force to counteract.

At 3.30 a.m. the pupils had been equal in size, widely dilated and immobile, but at 4 a.m. they were semi-contracted, and reacted very sluggishly to light. The eyelids were closed, and, though he made several strong efforts to open them, twisting up his face in the attempt, he was quite unable to do so until they were opened and shut for him several times with the finger; and even after this manipulation he was only able to open them incompletely and with considerable difficulty. Speaking in a high-pitched, faint, querulous monotone, he frequently repeated that his eyes were very dim, and that he could not see properly; but after getting some ice to suck, and a little cold water to sip, he said that he felt slightly better, and that his sight was gradually coming back. He was, however, still very faint and dizzy.

Soon after this he again became rapidly worse; his eyes were closed, and from time to time he moved his head rapidly from side to side on the pillow in a rhythmical manner; his pulse became very feeble, and then impalpable at the wrist,

though the vessel-wall could be distinctly felt, and indeed appeared to be in a state of spasmodic contraction. His heart, on auscultation, was beating very rapidly and feebly, and he became quite collapsed. His extremities were very cold, but after the application of hot tins to the arms and legs, a mustard-leaf over the præcordia, and half an ounce of brandy internally, he rapidly improved.

About 4.30 a.m. he had another severe tetanoid seizure affecting the upper limbs, especially the left. His hands became strongly dorsiflexed at the wrists, the fingers and thumb being held straight, while the metacarpo-phalangeal joints were slightly flexed. In addition to the biceps and the extensor muscles of the forearm, the supinator longus was also in strong contraction, the elbow being fully flexed. At the same time there occurred rapid twitching movements of the muscles elevating and drawing out the angles of the mouth, rather more marked on the right side, giving the patient a peculiar snarling appearance; and there was also slight clenching of the jaws from contraction of the masseter muscles. Beyond a slight stiffness of the left knee and ankle no tetanoid phenomena were observed in the lower extremities, though the patient afterwards stated that he had had the "electric-battery sensation" in the left leg and in both feet, and that the muscles of these parts felt as if they were tightly contracted. He "suffered great agony" during the muscular spasms of the upper limbs, relieved to some extent, as he had been previously, by bending the joints in the direction opposite to that of the contracture, and by moving them slowly and continuously backwards and forwards, firmly massaging the muscles at the same time. During the attacks the patient was unable to speak, but was quite conscious, nodding his head feebly when asked if the above treatment relieved his pain, and making signs for its continuation when it was stopped.

At 5 a.m. the pulse, though still soft and feeble, was greatly improved. The patient was still unable to open his eyes, until the lids had been worked up and down for him several times, after which he could raise the upper lids, but still only partially. By 5.30 a.m. he was able to speak in his normal manner. There was only slight contracture of the extensor muscles of the forearm, and all the joints could be freely moved. He complained

of great thirst and dryness of the mouth, and said that during the worst of his attack the right side of his mouth and tongue and the right cheek "felt all twisted up and twitching." He was quite conscious during the whole seizure. He knew what was going on around him, and described his sensations as "terrible," and "thought he was about to die." The pain was very much worse in the left arm, and he had a feeling "like getting the battery all down the left side of the body and in the left leg"—in fact, at the onset of the attack he thought that something had gone wrong with the electric light on the wall at the head of his bed, and that he was being affected by the current.

At 10.30 a.m. he could talk coherently and without difficulty, though his voice was somewhat husky, the tongue and mouth being very parched and dry, while his lips had a curious feeling of greasiness. The pulse was fairly good, but the vessel-wall appeared to be somewhat contracted. The fingers of both hands were still stiff, and were still held in the typical position described in tetany, the thumbs being now turned into the palms. The spasm was on this occasion only slight, and the patient could move the fingers, wrists, and elbows freely.

At 1 p.m. he was very prostrate, talked somewhat incoherently, and again complained of a "bissing" feeling in the hand. *The stomach was very much dilated*, reaching down nearly to the symphysis pubis, and contained much fluid. The fingers were still held in the position last described, the muscles of the forearms being stiff and firm; and pressure at the internal bicipital sulcus over the line of the brachial vessels and nerves caused a marked increase in the contractions. Lavage had hitherto been performed once daily—in the early morning—but Professor Greenfield now directed that the stomach should be washed out twice, and, if necessary, thrice daily, half a pint of warm milk containing one drachm of sodium phosphate being left in the stomach after the process of washing-out was completed. He also ordered hot-water and nutrient enemata.

At 2.30 p.m. a rectal injection of warm saline solution was given, but most of it was returned in about ten minutes. Vomiting occurred shortly afterwards, and another attack of tetany came on. The patient became almost speechless, and his pulse was very small, weak, and irregular, the vessel-wall

seeming to be in a state of spasmodic contraction. Both hands were flexed at the wrist, and the fingers were strongly flexed over the thumb, which was turned into the palm. Strophanthin, grain $\frac{1}{120}$, was administered hypodermically, and half an ounce of brandy given by the mouth. He made occasional rapid spasmodic movements of the face, the angles of the mouth being pulled upwards and outwards in a sort of involuntary snarl. He was quite conscious, and understood what was said to him, but for a considerable time could reply only by signs.

At 3 p.m., an hour after the commencement of this attack, the hands were still rigid, but he was able to speak and was not so collapsed. Since the onset of the tetanoid complications the patient had been too weak to have his stomach washed out, but it was now considered justifiable. The tube was therefore passed, and after a pint of stomach-contents had been withdrawn, the organ was thoroughly washed out with Condy's fluid, warm water, a half-saturated solution of boric acid, and warm water consecutively, a pint of warm milk containing 2 drachms of sodium phosphate and 40 grains of ammonium bromide being then introduced through the tube. In order to ensure the thorough evacuation of the stomach, the patient was placed in a semi-prone position on his left side, and gentle pressure and manipulation of the abdomen was used in order to assist it in expelling its contents through the tube. At 5 p.m. the pulse was much stronger, though the fingers were still firmly fixed in flexion; and an hour later the patient was sound asleep.

Next morning, November 3rd, he was looking very much better; his face was not so drawn and pinched, and his eyes were not so sunken; he was feeling fairly comfortable, and expressed great interest and astonishment at what he had just passed through. At 12.30 p.m. the stomach-tube was passed, and about two pints of bright-green fluid were removed. The organ was then washed out with Condy's fluid and with boric acid. Immediately after passing the tube the patient turned rigid all over, his face became twisted and contorted, and he was unable to speak. This passed off in about a couple of minutes, and warm milk and sodium phosphate were introduced as before. At this time the patient had not passed any urine

for over 40 hours. The bladder was not distended, and there was no pain or tenderness above the pubes. A catheter was passed in the evening, and 16 ounces of urine were withdrawn. The specific gravity of this was 1,023; it contained a trace of albumen, and granular and hyaline tube-casts, but no blood or sugar.

At 10.45 p.m. the stomach was again washed out, 15 ounces of slightly turbid emerald-green fluid being first withdrawn. This contained no free hydrochloric acid, but was acid in reaction, and gave the biuret test. No bile-acids were detected in the filtrate, and the indication of bile-pigments was uncertain. The precipitate was bright-green, and, as Condy's fluid had been used in washing out the stomach, it was examined for manganese, of which, however, no trace was found. No sarcinæ or torulæ were discovered on microscopic examination.

In addition to the milk containing phosphate of soda, 40 grains of ammonium bromide and ¼ grain of erythrol tetranitrate were left in the stomach. The spasmodic contractions of the arms became more marked on passing the tube, but gradually passed off towards midnight, when 8 ounces of sterilised normal saline solution were introduced into the subcutaneous tissue of the abdominal wall, followed by a similar amount 20 minutes later. This was rapidly absorbed, and the pulse very speedily improved, as did the patient's general condition, "his head becoming," he said, "much clearer" after this subcutaneous transfusion. During this attack his speech was affected as formerly. He was conscious, and after it he was quite rational, and indeed rather philosophical, quoting passages from Shakespeare and Burns about man's unfortunate lot.

On November 4th, at 10 a.m., the patient was lying quietly on his back. He had had a very good night's sleep, and his pulse was much improved. There was no rigidity of the hands and arms, but he still complained of tingling in them; and though he kept his eyes half closed he could raise the eyelids without difficulty. Trousseau's phenomenon was present, pressure in the region of the brachial vessels and nerves causing a well-marked recurrence of spasm in the muscles of the forearm and hand. He was now able to pass water himself. He had great difficulty in starting the act, but

after its commencement he had no further trouble, nor had he any pain on micturition.

He was quite rational, and described his sensations at the onset of the tetanoid seizure on November 2nd and 3rd as being "like the feeling of walking by the side of a railing with the sun shining through it;" and he felt as if he were "floating in this flickering light, and getting the galvanic battery." After this he became unable to move his fingers, and then the contractions supervened, causing him great agony, there being no loss of consciousness at any period.

In the afternoon he felt the "bissing" sensation again coming into his hands, but with a strong voluntary effort he managed to move his fingers, and the threatened attack passed off. In the evening he felt very comfortable, but had some difficulty in opening his eyes. There was no return of the twitchings or contractions, and he had no pain or tenderness in the abdomen, the lower border of the stomach being about half-way between umbilicus and pubes. From 8 p.m. he slept soundly until next morning.

The treatment adopted at this time was lavage twice daily; 2 ounces of milk (containing 2 drachms of sodium phosphate to the pint and diluted with hot water) every two hours; nutrient enemata; ammonium bromide, 40 grains three times a day; brandy and hypodermic injections of strophanthin during the collapse attendant on the attacks of tetany. An attempt was made to keep him in the prone position from time to time, but unsuccessfully, as he strongly objected to this procedure.

On the next day at noon the stomach was thoroughly washed out, after 13 ounces of green, very foul-smelling fluid had been removed. This was acid in reaction, but contained no free acid. Microscopically there were a few sarcinæ, numerous degenerated and swollen epithelial cells, and large numbers of bacteria.

In the afternoon the patient complained of a feeling of fulness and distension in the epigastrium, describing the sensation as "being like a bee pulled in half at the waist, and as if he had no middle." The pulse was full, soft, and dicrotic; and he was able to pass water himself, but with some difficulty at the commencement of the act.

In the evening he was very weak and dull, and objected strongly to having his stomach washed out, while previously he had given all the assistance in his power. He was now very melancholic, and asked to be left alone to die. Lavage was, however, persisted in, and, as the tube was being passed, a large eructation of horribly foul-smelling gases escaped, reminding one but too forcibly of the odour of eggs in a very advanced stage of putrefaction. Only a very small amount of fluid was ejected. This was pale-yellow in colour, not green as formerly. There was no free hydrochloric acid present, and it gave the biuret reaction; only a few sarcinæ, but very numerous bacteria and epithelial cells were found microscopically. No attacks of tetany occurred all day, and the same treatment was continued, with the addition of ¼ grain of erythrol tetranitrate three times a day.

A blood-count revealed:—Hæmocytes, 3,900,000; leucocytes, 22,500.

On November 6th the stomach-contents were again green, and as only boric solution and plain warm water had been used for two days this coloration could not be attributed to manganese. The reaction was neutral, the bacteria were still very numerous, and only a few sarcinæ were observed. The pulse was feeble and fluctuating, and the patient exceedingly low-spirited. On the following day he was very languid, and looked decidedly worse. The stomach-contents were green, and contained no free hydrochloric acid; no sarcinæ were observed, but bacteria were very numerous. Condy's fluid was again used, followed by plain warm water. At midnight he was unable to open the right eye, and complained of great stiffness in his joints, more especially in the knees and elbows. This, however, appeared to be subjective, as they could be freely moved and manipulated, and there was no rigidity of the muscles on passive movement. During the process of lavage he had a severe attack of hiccough and became rather collapsed, but after it he improved rapidly. (Blood-count:—Hæmocytes, 4,025,000; leucocytes, 17,500; hæmoglobin, 70 per cent.)

On November 8th the patient was very drowsy and weak, lying with his eyes closed. He had several severe attacks of hiccough. On the following morning the stomach-contents were greenish-yellow, and at night yellow and pea-soup-like in

character. At 10 p.m. the patient was very exhausted, and was unable to turn himself in bed. The pulse had become very feeble, and there was marked ptosis of the left eyelid.

On November 10th the patient was so weak that he could scarcely swallow the stomach-tube, and his memory and mental functions became greatly impaired.

On November 11th the contents of the stomach were greenish-yellow in colour, alkaline in reaction, and contained very many bacteria, but no sarcinæ. At midnight he appeared to be sinking fast. His pulse was very feeble and irregular, extremely variable from time to time, and sometimes altogether impalpable. Brandy was administered by the mouth, and ether and strophanthin given hypodermically.

On November 12th he remained in much the same condition, lying on his back with his eyes half shut, unable to keep himself from slipping down in the bed. The pulse was very irregular and almost impalpable. The abdomen was considerably distended with flatus, his legs being drawn up as if he were in pain, and his breath had a very offensive odour. He spoke in an almost inaudible, querulous, high-pitched monotone, and had a curious habit of repeating words or phrases five or six times before completing a sentence. It was not thought advisable in this condition of affairs to continue washing out the stomach. The erythrol tetranitrate and ammonium bromide were stopped, and one-grain doses of carbolic acid thrice daily were substituted. The patient's relatives were sent for as the end appeared to be at hand. (Blood-count:—Hæmocytes, 4,200,000; leucocytes, 40,000; hæmoglobin, 75 per cent.)

On November 13th, at 6.45 a.m., he was almost insensible. He did not answer questions, his pulse was impalpable at the wrist, and his extremities were very cold. Since the onset of the attack on November 2nd, the patient had been getting nutrient enemata regularly, but now these were not being retained, and he was unable to take any form of nourishment, as he was too weak to swallow, and would not permit either the passage of the stomach-tube or the administration of subcutaneous saline injections. A drachm of ether and $\frac{1}{60}$ grain of strychnine were given hypodermically, after which his condition improved somewhat, and the pulse became palpable at the wrist.

For the next two days he remained in much the same condition. He became delirious and required constant watching, to prevent him from getting out of bed; and on one occasion he succeeded in doing so, when the nurses were attending to another case in the ward.

On November 16th and 17th, however, there was some improvement. He began to ask for food and was able to digest considerable quantities of milk, while the nutrient enemata were not now being returned. His circulation also became much stronger, and he again began to take some interest in his surroundings. The lower border of the stomach was now only three-quarters of an inch below the umbilicus, and he had no pain or tenderness, nor could any tumour now be palpated in the region of the pylorus. He was now given five minims of liq. strych. hydrochloratis every four hours, in addition to the carbolic pills which he had been getting for four days.

From November 18th onwards steady improvement occurred, and though he still remained very emotional and childish, his mental condition became much clearer. On the 19th he was sitting up in bed reading the newspapers, and was very anxious to go home. The abdomen was still somewhat distended, the motions were very offensive, and large quantities of flatus were passed. The lower border of the stomach, on the 22nd, was an inch and a half *above* the umbilicus, there was no pain or tenderness, and the abdominal distension had subsided.

On November 25th, the stomach had returned almost to normal dimensions. In the left mammillary line it extended from the sixth to the tip of the ninth rib, and in the middle line its lower border was one inch above the umbilicus, the vertical measurement there being only three and a half inches. The patient was now able to take a considerable amount of nourishment, and on November 25th he was getting milk-diet, soup, and three pints of milk in the 24 hours, together with nutrient enemata containing peptonoids and brandy. Two days later he was able to take convalescent diet. The blood-count showed considerable anæmia, and the leucocytosis was now very much less. (Hæmocytes, 2,900,000; leucocytes, 9,500; hæmoglobin, 58 per cent.)

He remained in hospital until January 18th, 1902, and during the last month and a half made a gradual but uninterrupted

recovery, his weight rising from 5½ stones on November 26th, 1901, to 7½ stones on leaving the wards on January 18th, 1902. From Christmas onwards he was getting full ordinary hospital diet. His appetite was excellent, and he was able to digest his food very well indeed, remarking one day to Professor Greenfield, who happened to see him when he was at one of his meals, that "dinner was a grand institution!"

## II.

Several points of interest in connection both with this case and also with the general subject of gastric tetany suggest themselves. Before the onset of tetany the patient presented the typical clinical picture of old-standing atonic dyspepsia with gastric dilatation and retention. This was due probably to some form of pyloric obstruction, apparently simple or non-malignant in nature, though whether brought about by the dragging of an over-distended and partially displaced stomach acting mechanically upon the pylorus or duodenum, or due to stenosis from the cicatrisation of an old ulcer, it was impossible to say. The absence of any history of previous hæmatemesis, or melæna, the patient being an exceptionally intelligent and observant man, was certainly against, but did not by any means eliminate, the latter supposition; while the condition might have also arisen from old peritoneal adhesions or from the external pressure of a tumour or enlarged glands.

For three months before admission he had been washing out his stomach almost daily, but evidently only very imperfectly, as after a few days of this treatment in hospital the condition of the stomach rapidly improved. Even then, however, the amount of residual fluid in the stomach and the microscopic examination of its contents proved that the washing out was still somewhat imperfect, doubtless on account of the large size of the organ and the atonic state of its muscular walls. Throughout the course of his illness constipation was one of the most prominent and most troublesome symptoms present; and this, together with occasional severe attacks of diarrhœa, forms a combination of symptoms of frequent occurrence in cases of gastric tetany.

During the course of his illness the patient's temperature

was almost uniformly subnormal, being usually about 96° or 97° F. in the morning, and in the evening from 97° to 98° F.

The condition of the pulse during the attacks of tetany has already been noted as being very feeble or even impalpable; and, though this was mainly due to the great collapse, there also appeared to be a *spasmodic contraction of the vessel-wall itself*, not only during, but also to a less extent between the attacks. It was thought by Professor Greenfield that the beneficial effects described in some cases of tetany from the administration of thyroid extract might possibly be due to the antagonising of this apparent vasomotor spasm; and as, in the present instance, owing to the almost moribund condition of the patient, thyroid treatment was considered much too risky, small doses of erythrol tetranitrate were carefully administered in order to obtain this vaso-dilatator action — apparently with some benefit to the patient's condition. One ½-grain dose of this drug was given on November 3rd, and on the 5th a similar amount was given thrice daily.

The rate of respiration was normal throughout, except on November 6th and 8th, on which days it was from 28 to 30 per minute.

The amount of *urine* excreted is important. Previously to the attack of tetany it was small and very irregular in quantity, varying from 3 or 4 up to 30 or 36 ounces in the 24 hours. On the five days immediately preceding the attack, the amount was 12, 12, 7, 14, and 14 ounces respectively. No urine at all was passed for a period embracing the 24 hours before, and the 16 hours after, the onset; at the end of this period 16 ounces were drawn off with the catheter. On the third day after the onset, 67 ounces were passed, and on the succeeding days the amounts were 56, 54, 44, 48, 30, 24, and 46 ounces. During the remaining part of November the daily quantity of urine excreted varied from 30 to 80 ounces, and thereafter it became practically normal, being usually about 50 or 60 ounces.

Transient albuminuria has usually been described as occurring in the recorded cases of tetany; and in the present instance a trace of albumen was found in the urine collected on November 3rd, 4th, 5th, and 6th, corresponding to that secreted during the actual tetanoid seizure. Granting that the disease

is an auto-intoxication, this has usually been ascribed to the action of the supposed toxine on the renal epithelium during excretion by the kidneys. This may quite well have been the case in the present instance; but it must be borne in mind that a transient albuminuria of this nature is a frequent sequel of any severe acute abdominal disease complicated by suppression of urine, a condition which was present in this case during the most acute stage of the attack. After the period of suppression there was considerable difficulty in starting the act of micturition, apparently owing to a spasmodic contraction of the spincter of the bladder. This phenomenon has been noted in other cases by several authors; though in a case recorded by Tresilian,[1] in 1901, the opposite condition, *i.e.*, incontinence, is noted as having occurred.

Indications of the presence of bile-pigment in the urine were found from November 13th to 30th, and a trace was also noted from December 11th to 18th; there was, however, no general jaundice.

The condition of the blood has already been partly described. As above noted, there was considerable diminution of the hæmocytes and hæmoglobin both during and after the tetany; but by far the most important and interesting point brought out by the blood examinations was the presence of a very marked leucocytosis, mainly polymorpho-nuclear in character, the occurrence of which constitutes a very strong argument in favour of the toxic origin of the disease.

RÉSUMÉ OF BLOOD-COUNTS.

| Date. | Hæmocytes. | Leucocytes. | Hæmoglobin. |
|---|---|---|---|
| November 4th - - | 3,900,000 | 22,500 | — |
| ,, 7th - - | 4,025,000 | 17,500 | 70% |
| ,, 12th - - | 4,200,000 | 40,000 | 75% |
| ,, 25th - - | 2,900,000 | 9,500 | 58% |
| December 4th - - | — | 11,250 | — |

Differential counts of the varieties of leucocytes present were made for November 5th and 13th, *i.e.*, when the leucocytosis amounted to about 22,500 and 40,000 respectively.

| Variety of Leucocyte. | | November 5th. | | November 13th. | |
|---|---|---|---|---|---|
| Polymorpho-nuclear | | | 83·2 | | 92·6 |
| Mononuclear | Small | 7·3 | 16·6 | 2·0 | 6·4 |
| | Intermediate | 2·3 | | 1·7 | |
| | Large | 7·0 | | 2·7 | |
| Eosinophile | Coarse | | 0·0 | | 1·0 |
| | Fine | | 0·2 | | 0·0 |
| | | | 100·0 | | 100·0 |
| Total leucocytes per c.m.m. | | | 22,500 | | 40,000 |

It is unfortunate that no blood-estimations were made previous to the onset of the tetany, as a consideration of the number of red corpuscles present on the above dates might naturally lead one to suppose that a certain degree of concentration of the blood did actually take place, as was suggested by Küssmaul,[2] who in 1869, on the supposition that this concentration occurred, founded the theory that the cramps of tetany were due to the desiccation of the tissues.

Granting that some degree of concentration did occur, a corresponding allowance must of course also be made in the case of the leucocytes, but the number of these was so very markedly increased that, even if this reduction were made, a very considerable leucocytosis would still be recognisable. The apparent delay which took place in the occurrence of this leucocytosis, which did not reach its maximum until ten days after the onset of the tetany, is also interesting; but it will be recalled that it was about this date that the patient's condition was at its worst, and washing-out had to be discontinued.

*Vomited Matter and Stomach-Contents.*—These were acid in reaction from the date of admission until November 5th, on the evening of which day they were neutral; while from November 7th to 11th they were alkaline in reaction, owing, no doubt, in part at all events, to the administration of sodium phosphate. Free hydrochloric acid was present before, and absent during the period of tetany, but again no deductions can be drawn

from these facts in the present case owing to the treatment adopted.

The colour of the stomach-contents varied considerably from time to time. During the first month, *i.e.*, from October 4th till November 1st, they were almost colourless. Immediately before the attack of tetany they were light-brown, and thereafter, from November 3rd to 8th, they were emerald-green, except on the evening of November 5th, when they were pale-yellow in colour. On the morning of the 9th they were greenish-yellow, and on the same evening and next day they were chrome-yellow. On the 11th they were again greenish-yellow, and on the 12th they were bright-orange in colour. As already mentioned, the green coloration first appeared while Condy's fluid was being used to wash out the stomach, but no trace of manganese could be discovered, either in the filtered sediment or filtrate. It might, therefore, be supposed that this phenomenon was due simply to the regurgitation of bile, though the result of the tests for bile-pigments were uncertain, and no bile-acids were found in the filtrate.

Sarcinæ were numerous in the vomited matter immediately preceding the seizure, though none were found on November 3rd; a few were present on the 5th, very few on the 6th, and none from the 7th onwards. No bacteria were observed microscopically in the matter vomited on the day after admission. From November 5th onwards, as the sarcinæ became less numerous, great numbers of large motile and other bacilli were observed, and were still very numerous on the 11th and 12th. These bacteria appeared to increase and flourish, especially after the contents of the stomach had become less acid, neutral, and finally alkaline in reaction, a fact which perhaps appears to support Bunge's[3] theory that one of the principal functions of the free mineral acid secreted by the gastric mucous membrane is the disinfection of the material ingested by the stomach. It must, however, be remembered that at this time the patient's power of resistance to organisms was at a minimum; the stools were exceedingly offensive, the bowels atonic and distended with flatus, and the breath had a very bad odour. In fact, in addition to any specific form of auto-intoxication, he was also suffering from a condition of stercoræmia or fæcal poisoning. Specimens of the organisms found in the stomach-contents were

sent to the University Pathological Department, but, as noted later, no definite results were obtained from the investigation. On November 5th large numbers of degenerated epithelial cells were present in the stomach-contents.

With regard to the onset and course of the actual tetanoid seizure little need be said, as the case corresponds almost exactly with the classical description of the disease. The attack commenced with copious vomiting, the occurrence of which is said by some authorities, including Müller,[4] to determine the onset of the attack. This view is not accepted by Albu,[5] who states that it is not the act of vomiting, but the overfilling of the stomach with putrefying contents which brings on the attack; and he somewhat naturally remarks that all the patients who suffer from tetany have previously had frequent attacks of vomiting, which have been unaccompanied by any convulsive symptoms. Tetany, he avers, entirely disappears either gradually or immediately after the stomach has been thoroughly emptied. That over-distension (or acute dilatation) of the stomach is the determining or exciting cause of the onset of tetany may quite well be the case, as in the present instance that organ rapidly attained to enormous proportions at the height of the attack, reaching nearly to the symphysis pubis, while after the tetanoid symptoms disappeared, it rapidly returned to more normal dimensions.

The usual subjective sensory phenomenon of tingling in the hands and arms followed soon after the attack of vomiting, and after a recurrence of the latter, the tonic muscular contractions supervened. The alternate involvement of the flexor and extensor muscles of the forearm is noteworthy, as is also the fact that the left arm was considerably more affected than the right; and Albu[6] states that the contractions are hardly ever found to be symmetrical in strength on the two sides. The fibrillary twitchings in the muscles of the forearms, and the involvement of the tongue, lips, and eyelids, as well as the clonic spasms affecting the face and neck, pointing to the involvement either of certain of the cranial nerves, or of their centres of origin, are also points to be noted, while the occurrence of temporary blindness is interesting and might point to involvement of the optic nerves. In a case of tetany associated with lactation reported by Tresilian[7] in

1901, a similar temporary loss of vision occurred for a period of three days, and in the same patient there was also the history of loss of speech for one day, a condition which was observed by Küssmaul[8] in one of his cases. During the first tetanoid seizure the pupils were widely dilated and did not react to light, while later they became semi-contracted. Bouveret and Devic[9] state that the pupils are usually contracted in grave cases—"rétrécies et peu sensibles à la lumière. Il serait fort important de ne jamais négliger la recherche du myosis. Dans un cas, les pupilles étaient dilatées et immobiles quelques instants avant la mort." According to Albu, on the other hand, the pupils are usually widely dilated in cases of tetany. The severe cramp-like pains in the contracted muscles are said to be generally much increased on passive movement, but in this case the patient derived considerable relief from free movement and massage of the parts affected.

*Prognosis.* — All authorities agree that the prognosis in cases of gastric tetany is exceptionally grave. Various series of cases show that the mortality in this disease is from 60 to 75 per cent. and even higher. Only one out of 11 of Frankl-Hochwart's[10] patients recovered; and of 23 cases collected by Bouveret and Devic[11] in 1892, 18 died, giving a mortality of 74 per cent., or, as in two of the cases death was not directly attributable to the tetany itself, it may be placed at 69·5 per cent. In a more recent series quoted by Albu,[12] 31 out of 40, or 77·5 per cent., of the cases terminated fatally.

Albu divides cases of tetany into two groups, benign and malignant, the former due to ulceration with hyperchlorhydria, sarcinæ and torulæ being found in the stomach-contents; while in the latter and rarer malignant form, due to pyloric or duodenal cancer, the Bacterium lactis and lactic acid, but no free hydrochloric acid, are found. In addition to the serious danger to the patient's life during the actual occurrence of the tetany, there is always in such cases a very great risk of relapse or recurrence of the disease. The nature of the morbid condition present in the stomach or in the neighbouring organs must also, of course, be taken into consideration.

The present case is of interest from the fact that, as far as one can judge from the literature on the subject, it is the

severest recorded case of gastric tetany in which recovery has taken place.

*Treatment.*—Whatever the ætiology of gastric tetany may be—and the toxic theory is certainly of value in that it affords us a rational basis upon which to ground our treatment—almost all modern observers agree that the method of treatment to be employed in such cases is the thorough washing out of the stomach and the complete evacuation of its putrefying contents. Get rid of the fermentation and cure the gastric dilatation, and the cause of tetany, whatever its nature and origin may be, will also be removed. This end can only be attained by washing out the stomach; and on the supposition that the cause may be organismal, it is convenient, as well as advisable, to use some mild antiseptic, such as boric acid or potassium permanganate. The action of these may be assisted by giving the patient small and carefully regulated doses of carbolic acid (in pill), sodium sulphite, or, as Risien Russell [13] recommends, resorcin or naphthol. The washing out must not only be thorough, but it must be frequently repeated—once, twice, or even three times daily—large quantities of fluid being used in the process. Owing to the atonic condition of the walls of the stomach, and to the abnormal position of that organ, it has considerable difficulty in completely expelling its contents through the tube, and it is therefore advisable to assist it mechanically in so doing by gentle abdominal pressure and manipulation, while the plan of turning the patient into the prone or semi-prone position will often materially aid and hasten the operation.

Even in certain modern text-books may be found the statement that gastric tetany is caused by washing out the stomach, and that this form of treatment must therefore be specially avoided. No statement could be more erroneous and more fraught with danger to the lives of the unfortunate patients who are liable to an attack of the disease. Clifford Allbutt,[14] in his *System of Medicine*, says that "careful washing should rather cleanse and prevent evil, than be itself the cause of tetany and convulsions. . . . I have been washing out stomachs for 15 years, at one time on a large scale, yet I have never seen tetany or convulsions in such cases, either during syphonage or otherwise." This view was strongly held by Professor Greenfield; and the efficacy and

success of this method of treatment is certainly exemplified in the present case.

As adjuvants to the above method of treatment, certain drugs may also be of some therapeutic value in cases of tetany. During the stage of neuro-muscular irritability bromides are indicated, and of these the bromide of ammonium is the most suitable. Such drugs as chloral and opium must, of course, be avoided in view of the great collapse and prostration in such cases, free stimulation being necessary for these conditions. In the present case the hypodermic injection of strophanthin and, during the worst part of the attacks, of ether, was found to act well; and, in spite of the theoretical arguments of some observers against the use of alcohol in such cases, the administration of small quantities of brandy by the mouth helped to tide the patient over the period during which he appeared to be actually moribund, and during which he could take no other form of nourishment either by the mouth or by the rectum.

It was also found in the present instance that the feeling of gastric discomfort and tendency to vomiting were considerably allayed by the following method which Professor Greenfield has for several years adopted with very marked benefit in many cases of gastric dilatation. After washing out the stomach with a solution of phosphate of soda, and previously, if necessary, with weak Condy's fluid or boric-acid solution, a certain quantity, say 10 ounces, of boiled milk containing sodium phosphate in the proportion of a drachm to the half-pint, is left in the stomach, diluted with hot water. This method has been found of great value in allaying gastric pain and irritability.

To the use of such substances as carbolic acid, the sulphites, and other antiseptics, allusion has already been made. Enemata and purgatives such as calomel, and later regular doses of cascara, are required to obviate the tendency to constipation. Thyroid extract has been stated by some to have proved beneficial in certain cases, on the supposition that the secretion of the thyroid gland aids in neutralising or destroying the specific poison of tetany. In view of the fact that during the acute stage of the disease in the present case there appeared to be some degree of vasomotor spasm present, it is

possible that the benefit said to be derived from thyroid treatment is due to the antagonising of this phenomenon by the vaso-dilatator action of thyroid extract; and, as stated above, small doses of erythrol tetranitrate were given in the present case for this purpose, apparently with some degree of benefit, the administration of thyroid extract itself being, as already mentioned, thought too dangerous in view of the extreme prostration of the patient.

During the tetanoid seizure the application of cold to the spine, and counter-irritation over the region of the stomach, are recommended by some authorities, the former proceeding having been said in some instances to have immediately stopped the contraction. These methods were, however, not tried in the present case.

The pronounced and almost immediate benefit derived from the subcutaneous transfusion of normal saline solution is a very important point; and this form of treatment would certainly have been continued had not the patient absolutely refused to permit it on account of the pain which it caused him, a preliminary injection of cocaine being thought too dangerous under the circumstances. The introduction of fluid into the patient's system was also brought about by means of saline enemata, but latterly, as already noticed, these were not retained long enough for absorption to take place.

During early convalescence the return of the stomach to normal dimensions was greatly aided and hastened by the use of strychnine, the action of this drug being found useful in stimulating gastric and intestinal peristalsis. Subsequently the patient's general condition was improved by the administration of tonics, such as quinine and iron, malt, cod-liver oil, &c.

The diet must be carefully regulated. Small quantities of warm diluted milk containing sodium phosphate, and, if necessary, peptonised, should be given regularly and at frequent intervals, together with peptonised nutrient enemata containing brandy. As convalescence advances, the meals must be regular, small in quantity, and if necessary still peptonised. The use of fluid with or immediately after meals must be restricted, and rest after food insisted upon. The patient should be instructed to take mild daily exercise, and to keep the action of the bowels regular by means of Carlsbad salts, cascara,

or, if necessary, by the use of enemata. Above all things the condition of the stomach itself must be carefully watched, and should symptoms of dyspepsia and dilatation return, recourse should again be had to the regular use of the stomach-tube.

The question of successful surgical interference in cases of tetany is one which attracted considerable attention a couple of years ago, when Mr. Mayo Robson [15] published the reports of three cases upon which he had successfully operated. The morbid conditions found in these cases were, respectively, cicatricial stenosis of the pylorus with hypertrophy; marked pyloric stenosis; and ulceration of the pylorus with adhesion to the gall-bladder, liver, and abdominal walls, with thickening. The operation of pyloroplasty was performed in all three cases, in the last after separation of the adhesions; and all made good and uninterrupted recoveries with no recurrence of the tetanoid spasms. It must be noted, however, in connection with these results, that when Mr. Mayo Robson read his paper before the Leeds and West Riding Medico-Chirurgical Society, on November 4th, 1898, Dr. Trevelyan, who was present at the discussion, was somewhat inclined to doubt whether Mr. Mayo Robson's patients were actually cases of genuine gastric tetany, which is a very rare disease. The accuracy, however, of the diagnosis made by such an eminent surgeon and clinical observer as Mr. Mayo Robson can scarcely be doubted, and the result of operation in these cases was certainly very satisfactory.

The *history* and *bibliography* of gastric tetany has been so fully recorded by some of the recent writers on the subject, *e.g.*, Albert Albu,[16] Clifford Allbutt,[17] Risien Russell,[18] Trevelyan,[19] Souttar McKendrick,[20] Halliburton and McKendrick,[21] and others, that reference need only be made here to some of the more recent recorded cases and experimental researches on the subject. The rarity of the disease, and the obscure nature of its causation, have naturally given rise to considerable discussion and divergence of opinion, and various theories have been propounded to explain its ætiology and pathology, but the problem still remains unsolved.

Küssmaul [22] in 1869 suggested that the muscular contractions of tetany were due to the desiccation of the tissues, owing to the quantity of fluid secreted by the gastric mucous

membrane, and also to the insufficient absorption of liquid by the deranged alimentary canal. To support this argument he cited as a parallel the cramps of cholera, which were then supposed to be due to the concentration of the blood from loss of serum in the stools, instead of to the toxic products absorbed from the alimentary canal, as is now known to be the case. Küssmaul apparently thought that this altered and inspissated condition of the blood affected the motor centres of the central nervous system in some unexplained way, and that the influence of these upon the abnormally dried-up muscles brought about the tetanoid contractions. Albu,[23] in his paper on Tetany, is inclined to think that there are some arguments in favour of Küssmaul's theory, *e.g.*, the occurrence of tetany in cases of profuse chronic diarrhœa described by Ewald,[24] himself and others; and the diminished quantity of urine in cases of stenosis of the pylorus. He also quotes a case described by Müller [25] in which the hæmocytes were increased by half a million per c.m.m., remarking, however, that this observation has not been confirmed in similar cases by other observers.* Albu therefore thinks that the loss of fluid, though not the actual, is at all events an important predisposing cause of the disease.

Again, it has been suggested by other authorities, *e.g.*, Germain Sée,[26] supported by Berlizheimer,[27] Müller,[28] Collier,[29] and others, that the contractions owe their origin to a reflex action produced by irritation of the sensory nerves of the stomach and more especially of the pylorus. The theory that this is the essential cause of tetany has now in most quarters been abandoned, but Fleiner [30] believes that both the foregoing theories are correct, and that the introduction of the stomach-tube starts the reflex mechanism, which acts upon an abnormally dried-up, and presumably on this account more easily excitable, neuro-muscular apparatus. The assertion of Albu that the reflex is not the essential, but merely the accidental cause, appears more correct; and in support of this statement he cites the somewhat analogous cases of strychnine-poisoning in the frog, and tetanus in the human subject, in which toxic conditions

* In the present case the red cells were markedly *diminished* in number, being 3,900,000 before the attack, and 4,025,000 and 4,200,000 per c.m.m. on the fifth and tenth days respectively, while they fell as low as 2,900,000 three weeks after the onset of the tetany. As has already been shown, however, some degree of concentration does seem to have occurred during the attack.

the slightest peripheral irritation is sufficient to bring on a convulsive attack.

Both the foregoing theories have now been practically superseded by the almost universally accepted supposition that the disease is due to an auto-intoxication from the absorption of a poison or poisons generated in the retained and putrefying contents of a dilated and atonic stomach. Whether these are of organismal or of chemical origin is still a doubtful question.

In recent years there has been accumulated a considerable amount of evidence tending to prove that this is the case, and from the stomach-contents in cases of tetany various substances supposed to be the cause of the disease have from time to time been isolated.

Bouveret and Devic,[29] in their elaborate research published in 1892, endeavour to show that this supposed toxine is produced, not by the growth of a pathogenic organism in the stomach, but by the prolonged and abnormal chemical processes of digestion in certain cases of gastric dilatation and hypersecretion, "gastric retention," as they name it, "playing an important part in the production of the substance which causes the convulsions." These observers were unable to determine the nature of this substance, but thought it probably a syntonin to which the addition of alcohol gives new properties. They state, however, that the toxin is not ethylamine hydrochlorate, or ethylene diamine, as has been stated by some authors. In connection with the researches of Bouveret and Devic it may be noted that two other French observers, Cassaet and Ferré,[31] allege that they have been able to isolate this toxic syntonin from the urine of patients suffering from certain diseases other than tetany.

Brieger[32] in 1887 isolated, or rather by an elaborate method prepared, from the products of the artificial peptic digestion of fibrin, a toxic substance which he called peptotoxin, and which, when injected subcutaneously into animals, caused death with paralytic and not with convulsive phenomena. Bouveret and Devic, however, state that intravenous injection of this substance produces violent convulsions; but they add that this peptotoxin does not pre-exist in the gastric contents, but is produced in the process of extraction with alcohol, which in this instance acts not merely as a solvent, but as an

active agent in its formation, together with free hydrochloric acid in presence of peptone. They even add that alcohol must on this account be absolutely forbidden in cases of hyperchlorhydria, and more especially in those complicated by retention of gastric contents. If their contention that alcohol is an active agent in the formation of this toxic substance be correct —and they bring forward very strong evidence in support of this assertion—some of the recent experimental work on the subject would be proved of little value, as this solvent has generally been made use of in the various attempts to isolate the supposed toxine. This objection may be raised as to the value of a recent research by Halliburton and McKendrick,[33] in which rectified spirit and then normal saline solution were used as solvents, it being taken for granted that the supposed toxine is soluble in alcohol; nor was any account taken by these observers of those substances which were insoluble, or which were driven off during evaporation. Bouveret and Devic's allegation that Brieger's peptotoxin was merely the product of the processes of extraction employed, might with even greater emphasis be made as to the results obtained by Halliburton and McKendrick.

If the cause of tetany be a poison generated in the stomach, it is to be expected that the injection of the un-manipulated gastric contents would reproduce in animals the muscular contractions typical of the disease. Experiments in this direction have, however, hitherto proved negative, *e.g.*, those of Müller,[34] Von Jaksch,[35] Berlizheimer,[36] Blazicek and Landsteiner.[37] Gumprecht[38] and Albu[39] also obtained no results from the experimental inoculation of animals. Similarly, in the present case no results were obtained from a series of inoculations into rabbits and guinea-pigs, performed by Dr. J. M. Beattie, Lecturer on Pathological Bacteriology in the University of Edinburgh. In these experiments subcutaneous injections were made of the following solutions, which were kindly prepared for the purpose by Dr. T. H. Milroy, Lecturer on Physiological Chemistry :—

1.—Filtrate of unaltered stomach-contents.

2.—Filtrate of stomach-contents evaporated to dryness *in vacuo* over strong sulphuric acid at a temperature of 40° C, and extracted with normal saline solution.

3.—Filtrate of stomach-contents evaporated as in No. 2; extracted with alcohol; again evaporated to dryness, and then extracted with normal saline solution.

These extracts were prepared from the stomach-contents removed on the morning of November 5th, three days after the onset of the tetany, and not from the matter vomited on the first day of the attack, which was unfortunately not kept for investigation.

As already stated, no result whatever, either of a paralytic or of a convulsive nature, followed these inoculations, though it is to be regretted that none of the injections were made by the intravenous method, as is recommended by Bouveret and Devic.[89] Another line of research which suggests itself, and which may possibly in the future lead to some definite result, is the introduction of the gastric contents from cases of tetany directly into the stomachs of animals, after having previously clamped or ligatured the pylorus either completely or incompletely, in order to bring about an artificial retention of the contents of the organ. As far as I am aware, no attempt has hitherto been made to introduce the poison into animals by way of the stomach itself; and, though the carrying out of this method would certainly present many difficulties, it would more closely approximate to the conditions under which tetany arises in the human subject. The incubation of normal and abnormal gastric contents, to which has been added some of the fluid from the stomach of a patient with tetany, the investigation of the resulting products, and the introduction of them into animals, would also be of considerable value and interest.

Another fact which appears to militate strongly against the supposition that the various toxic substances isolated by Brieger, Bouveret and Devic, and others are the cause of tetany, is the comparative frequency of cases of dilatation of the stomach with hypersecretion and so-called gastric retention, and on the other hand the great rarity of tetany as a complication. If the latter be due to the perverted and prolonged chemical processes of peptic digestion, why should not tetany supervene in almost every case of atonic dyspepsia? Granting that the disease is of toxic origin, this argument, if argument it can be called, seems to be strongly in favour of the view that the poison or poisons

are the product of some special organism or set of conditions yet to be discovered, the presence of which requires to be superadded to the above-mentioned pathological condition of the stomach. In this connection it is a point of some interest to note that in almost all the recorded cases in which the vomited matters have been examined, sarcinæ have been found. In the present case these organisms were very numerous before and during the seizure, but, probably owing to the method of treatment adopted, they afterwards became greatly diminished in number and then disappeared entirely, their place being taken by large numbers of bacteria. That these sarcinæ or their products are the cause of the disease it is almost impossible to believe, as these organisms abound and flourish in many other morbid conditions of the stomach, but their presence in the recorded cases of tetany almost without exception appears to be more than mere coincidence. It may be that this phenomenon is simply due to the fact that certain surroundings are favourable to the occurrence both of sarcinæ and of the organism or process by which the supposed convulsive poison is generated; and clinically the persistence of sarcinæ may be taken as an indication that the local treatment has been inadequate, and that more thorough washing out is required.

An effort was made to isolate the various forms of bacilli found in the stomach-contents from November 5th onwards, but owing to the infinite variety of these which were found to be present in the cultures, no definite results were obtained, various forms of B. coli being the only important organisms recognisable. The injection of cultures of these various organisms into animals was also negative in result.

Another aspect of the ætiology of tetany which has led to much discussion is the question whether, if we grant that the auto-intoxication theory is correct, the toxine acts on the cells of the central nervous system, or directly upon the peripheral nerves. The former of these views was held by Küssmaul,[41] and certain changes have been described in the motor cells of the anterior cornua of the cord. Risien Russell[42] states that hyperæmia and swelling of these cells occur, followed later by atrophy and sclerosis; and Weiss[43] suggests that the paroxysms in tetany may possibly be explained by the occurrence of periodic spasm of the vessels in the grey matter of the cord.

Albu,[44] on the other hand, believes that it is the peripheral nerves which are affected by the toxine, and thinks that the disease is somewhat analogous to peripheral neuritis, especially to those forms of that disease which are due to certain poisons, for example, post-diphtheritic paralysis and plumbism; and he concludes that the condition is probably a multiple toxic neuritis. No light is thrown upon this question by the present case, as the patient fortunately recovered; and in the majority of the recorded fatal cases, either the microscopic condition of the nerves and nerve-centres was not investigated, or the result of their examination was negative.

By some observers, Albu among others, the occurrence of the so-called Symptoms of Trousseau,* Erb†, and Chvostek,‡ has been supposed to point to the involvement of the peripheral nerves, but on the other hand in such conditions as tetanus or strychnine-poisoning, in which the action of the poison is undoubtedly upon the motor nerve-cells of the anterior cornua, there is also increased mechanical and electrical excitability of both sensory and motor nerves.

The possibility that the muscles themselves may be affected by toxic substances circulating in the blood must not be overlooked; and, though it is sometimes impossible to differentiate

* Symptom of Trousseau.[45] Recrudescence of the tetanoid spasm, produced by pressing over the main vessels and nerves of the limb. To quote Trousseau's own words:—"So long as the attack is not over, the paroxysms may be reproduced at will, even though the patient has been free from them for 24, 36, 48, 72 hours, and more. This is effected by simply *compressing the affected parts, either in the direction of their principal nerve-trunks, or over their blood-vessels, so as to impede the venous or arterial circulation* . . . not only when the arterial or venous circulation was interrupted, but also when the median nerve was compressed in the arm, or the brachial plexus above the clavicle, the contractions came on, immediately preceded by the sensation of formication, which is its first symptom. . . . This phenomenon, which is already interesting in itself, is not besides without its practical utility; for it furnishes us with a means of diagnosis, as in no other convulsive disease are such effects produced by similar means."

† Symptom of Erb.[46] The increased electric excitability of the nerves and muscles, especially to anodal stimulation, the order of muscular response to galvanic electricity being usually in such cases as follows:—

(1.) A.C.C., (2.) A.O.C., (3.) K.C.C.
or, (1.) A.O.C., (2.) A.C.C., (3.) K.C.C., A.O.T.;

anodal opening tetanus being got in no other known condition.

‡ Symptom of Chvostek.[47] The increased mechanical excitability of the motor nerves and muscles of the affected parts, *e.g.*, contraction of the facial muscles of one side on tapping over the facial nerve near its point of emergence from the stylo-mastoid foramen.

clinically between the respective parts played by the muscular and nervous elements in some varieties of muscular spasm, there can be no doubt that in certain forms of cramp the cause is to be found in the fact that toxic substances are circulating in the muscles themselves. These poisons may be produced within the body by such diseases as gout and rheumatism ; they may be due to defective removal and elimination of the products of metabolism, such as sarco-lactic acid, carbon dioxide, &c. ; or again, as in the present case, they may be absorbed from the alimentary canal within which they are generated by the action of organisms or by the perverted and deranged processes of digestion. The action of veratrine, and to a less degree that of the barium-salts, in prolonging the contraction of muscle is well known to physiologists, and certainly suggests the possible existence of other poisons capable of acting on muscular tissue directly. Again, in the study of neuro-muscular phenomena, the action of curare on the end-plates of voluntary motor nerves is suggestive of other possibilities in the elucidation of this problem. Though some abnormal condition of the muscles, due to the presence of a poison, or to a state of faulty nutrition or of defective excretion, may aid in the production of tetanoid spasm, it is in all probability to the investigation of the nervous system that we must look for the ultimate explanation of the muscular cramps of tetany ; though whether the morbid change be central or peripheral, it is as yet impossible to say, the evidence being at present rather in favour of the latter supposition—a supposition which, however, can only be proved or disproved by careful experiment in the laboratory.

*Subsequent History of the Case.*—Towards the end of May, 1902, the patient returned to hospital for observation, and was admitted to the wards on May 30th. Though rather pale, he looked in fairly good health. He weighed 7 stone 2½ lbs., as compared with 7 stone 7 lb. on leaving hospital on January 18th. Since that date he has been in very good health until about the middle of April, at which time his bowels began to be very irregular. A fortnight later he had a shivering fit followed by very severe diarrhœa, having as many as two and sometimes three motions every hour, and passing large quantities of mucus and flatus with the stools.

His appetite was excellent, being, as he somewhat quaintly

remarked, "far too good for his stomach." Six weeks after leaving the ward, the feeling of heaviness and pain after meals, and then the vomiting, reappeared, and for this condition he again had recourse to the stomach-tube, generally making use of it every other day. Since that time he had remained in much the same condition, feeling quite well for a day or two, and then, with exactly the same diet and precautions, having a relapse for several days. Two interesting symptoms which always attended these attacks were a feeling of greasiness of the lips "as if they had been oiled," and great thirst. The tongue was pale, large, moist, and flabby, somewhat tremulous, and with no marked fur.

The abdomen presented some slight general fulness, rather more marked in the left hypochondrium, epigastrium, and umbilical region. Slight irregular peristaltic waves were visible at intervals over the whole abdomen, but from time to time a very distinct, broad wave was observed to emerge from the left costal margin about the level of the tip of the ninth rib, and to travel downwards and inwards towards and slightly past the umbilicus. Occasionally the whole stomach was seen to stand out in marked relief, its lesser and greater curvatures showing up with great distinctness. The former was now considerably displaced downwards, being situated about half-way between the xyphisternum and the umbilicus; while the lower border was about an inch or an inch and a half below the navel. These spasmodic contractions were not accompanied by any pain. The organ contained a large amount of fluid, and succussion could very easily be performed. Several large, hard, somewhat ovoid masses could be felt deeply in the regions of the transverse colon and sigmoid flexure; but as these were freely movable, and could not be felt a few days later, they were in all probability masses of fæces in the large intestine. Some slight resistance could, however, still be made out in the region of the pylorus in the same position as during the patient's former stay in hospital.

The stomach-contents contained free hydrochloric, but no lactic or butyric acid. Large numbers of sarcinæ and torulæ were present at first, but speedily disappeared under treatment and daily lavage with Condy's fluid and phosphate of soda.

The blood-count at this time showed considerable anæmia,

the red corpuscles numbering 2,905,000 and the hæmoglobin being 55 per cent. The leucocytes were practically normal in numbers, and in their differential characters, with the exception of the absence of eosinophiles, none of these being observed while counting 1,000 white cells. The total number was 9,000 per c.m.m. (polymorpho-nuclear, 76·7 per cent.; mononuclear, small, 12·7 per cent.; intermediate, 4·2 per cent.; large, 6·4 per cent.; total mononuclear, 23·3 per cent.).

Nothing of interest occurred until June 10th, on which day the patient had somewhat severe cramps in the calves, peroneal muscles, and toes of both extremities. These came on every 10 or 20 minutes during the forenoon, and usually lasted about a minute, both legs being affected equally. The pain accompanying these cramps was severe, and was alleviated by rubbing and kneading the muscles vigorously. There was no preliminary tingling, and the upper extremities were unaffected. These muscular cramps did not recur, but, in view of a possible recurrence of tetany, Professor Greenfield considered that the time had now come for operative interference; and this opinion was concurred in by Mr. Francis Caird, who saw the patient with him on June 17th.

On June 24th Mr. Caird accordingly performed the operation of posterior isoperistaltic gastro-jejunostomy. An incision about three and a half inches long was made in the middle line of the epigastrium, and through this the dilated and rather thin-walled stomach at once protruded. The pylorus was found to be greatly narrowed and somewhat thickened and hypertrophied, and at its upper and posterior part there were very firm, puckered, cicatricial adhesions to the surface of the gastro-hepatic omentum, while similar old peritonitic bands were also found between the lower and anterior aspect of the pylorus and the adjacent surface of the great omentum. These were carefully separated, and when the stomach was turned upwards to reach its posterior aspect, two small groups of fine, very white, glistening fibrous bands were found on the serous membrane about or slightly above its centre. In appearance these reminded one of the fine, fibrous bands seen in the newly-cleaned capsule of a joint or in an aponeurosis. After these were separated the above-mentioned operation was successfully carried out.

The mesenteric and omental glands were well marked, and the lacteals at the time of the operation were filled with chyle, though the patient had only had a small quantity of milk four hours previous to operation.

A minute lymphatic gland from the neighbourhood of the pylorus, and the small portions of stomach and jejunum removed in making the artificial communication between these organs, were examined microscopically. The *stomach* (posterior wall about 2 or 2½ inches from pylorus) showed numerous micro-organisms, mostly cocci, in the free mucus on the surface of the mucous membrane, and also in the mouths of the glands. There were some catarrhal changes in the epithelial cells, especially towards the surface. The pepsin-secreting cells were markedly reduced in numbers and showed considerable degenerative change, in some parts amounting to almost complete disorganisation. The eosinophile or acid-secreting cells were not appreciably diminished in numbers, but did not stain so deeply as usual, while there was considerable increase of mucin-secreting cells in the deeper parts of the glands. The most striking feature of the sections was the great increase in the number of leucocytes and wandering cells emigrating through the mucous membrane, while there was also some increase of lymphoid tissue, and some congestion of the sub-mucous coat, especially noticeable in the small veins. The sections of *jejunum* exhibited no marked pathological changes, the epithelium being normal, and there being no increase of migratory leucocytes.

The *lymphatic gland* was considerably atrophied and somewhat fibrous, the sinuses being in some parts widely dilated and containing nothing but fibrin. There was very marked proliferation of the reticulum, and in the sinuses there were numbers of large proliferated endothelial cells showing numerous mitotic figures—evidently actively phagocytic in character, and containing brown and greenish-yellow pigment, together with the remains of small finely-granular eosinophile cells, which were present in considerable numbers in the lymph-sinuses.

The patient has since made an uninterrupted and uneventful recovery, being allowed up for the first time on July 12th, 19 days after the operation. He has now been at home for

some time; and when I heard last from him, he had just returned from a day's fishing in the country. His appetite is now excellent, and he has no pain or discomfort after food. He is steadily gaining in weight and strength, and, in view of the result attained, the operation may be considered not only justifiable, but eminently successful.

In conclusion, I wish to tender my sincerest thanks to Professor Greenfield and to Mr. Caird for permission to record the case, and also to the former for the invaluable advice and kind help which I invariably received from him while preparing it for publication. My thanks are also due to Drs. Beattie, Milroy, and Hunter for their kind assistance in the investigation of its chemical and bacteriological aspects.

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## A CASE WITH COMMENTS.

### A CASE OF SPONTANEOUS RUPTURE OF A BICORNUATE UTERUS DURING PREGNANCY.

By A. DONALD, M.D., *Surgeon to St. Mary's Hospital, Manchester,* and W. K. WALLS, M.B., *Obstetric Assistant Surgeon to St. Mary's Hospital, Manchester.*

Although spontaneous rupture of a bicornuate uterus during pregnancy and labour is known to occur, the accident is so very rare that it seems advisable to record the following case.

At a meeting of the North of England Obstetrical and Gynæcological Society held in April 1899, Dr. Walls described a case of labour which occurred in a patient with a bicornuate uterus. "The patient was pregnant for the fifth time, and the previous four confinements had all been tedious or instrumental. When she was admitted to St. Mary's Hospital, Manchester (Nov. 30th, 1898), she had been nineteen hours in labour. The abdomen was curiously distorted, and the fœtal head was directed forwards in the region of the umbilicus. The pelvis was occupied by a large firm mass, bulging towards the posterior vaginal wall. The vagina was long and narrow, the os uteri high up above the pubis, and there was a hand presenting. Under chloroform, version was performed and a stillborn male child was delivered. During delivery it was clearly made out that one had to deal with a case of uterus bicornis unicollis. The right horn containing the placenta was retroflexed, and formed the mass which was felt in the pouch of Douglas. The left horn was occupied by the legs and the greater part of the trunk of the child, while the fœtal head was contained in a cavity between the two muscular horns. After delivery each horn was found to be thick, but the roof of the cavity intervening was composed of a thin and folded layer of tissue. The patient made an excellent recovery, but at one time the right horn became retroflexed and gave rise to a sudden attack of hæmorrhoids which disappeared after bimanual replacement of the retroflexion."

Nothing more was heard of the patient until she was admitted to the hospital, on Jan. 11th, 1900, for another confinement which was expected daily. She was seen by Dr. Ross, the Resident Obstetric Assistant, to whom we are indebted for the following notes. On admission she was under the influence of alcohol; she had a furred tongue and was vomiting frequently; the temperature was slightly elevated. On examining the abdomen, the fœtal parts could be felt with extraordinary distinctness; in fact they seemed to lie just underneath the skin. At the time of the patient's admission the fœtus was moving actively. On the following morning the patient said that she no longer felt the movements, and on auscultation no fœtal heart could be heard. The fœtus lay transversely in the left dorso-anterior position, with one foot almost at the os, which lay high up on the right. On the 14th of Jan., about 9 a.m., pains began and about six o'clock p.m. the os was dilated sufficiently to admit two fingers. There was some slight hæmorrhage and the edge of the placenta could be felt. The cervix and vagina were packed with gauze. During the next forty-eight hours the patient was fairly comfortable, but in spite of the plugging, which was changed, there were no more pains and no further dilatation. On the evening of the 16th there was a fair amount of hæmorrhage on removing the gauze, and chloroform was therefore administered and the leg brought down into the vagina. The skin of the fœtus was peeling. On the 17th January at one p.m. Dr. Donald saw the case with Dr. Walls and Dr. Ross and it was decided to try extraction under anæsthesia, as the patient was becoming exhausted and there was no further advance. Multiple incisions were made in the cervix, and the head was perforated through the base of the skull, but in spite of this, the cervix tore during extraction and the rent extended through the right postero-lateral fornix into the broad ligament and peritoneal cavity. On passing the hand into the uterus to remove the placenta it was found that the two horns of the uterus had separated, and that there was an extensive gap in the intervening tissue, through which the hand entered the abdominal cavity.

At two o'clock the abdomen was opened and the uterus drawn out of the wound. The tear between the two horns was very extensive, and for some distance from the site of the

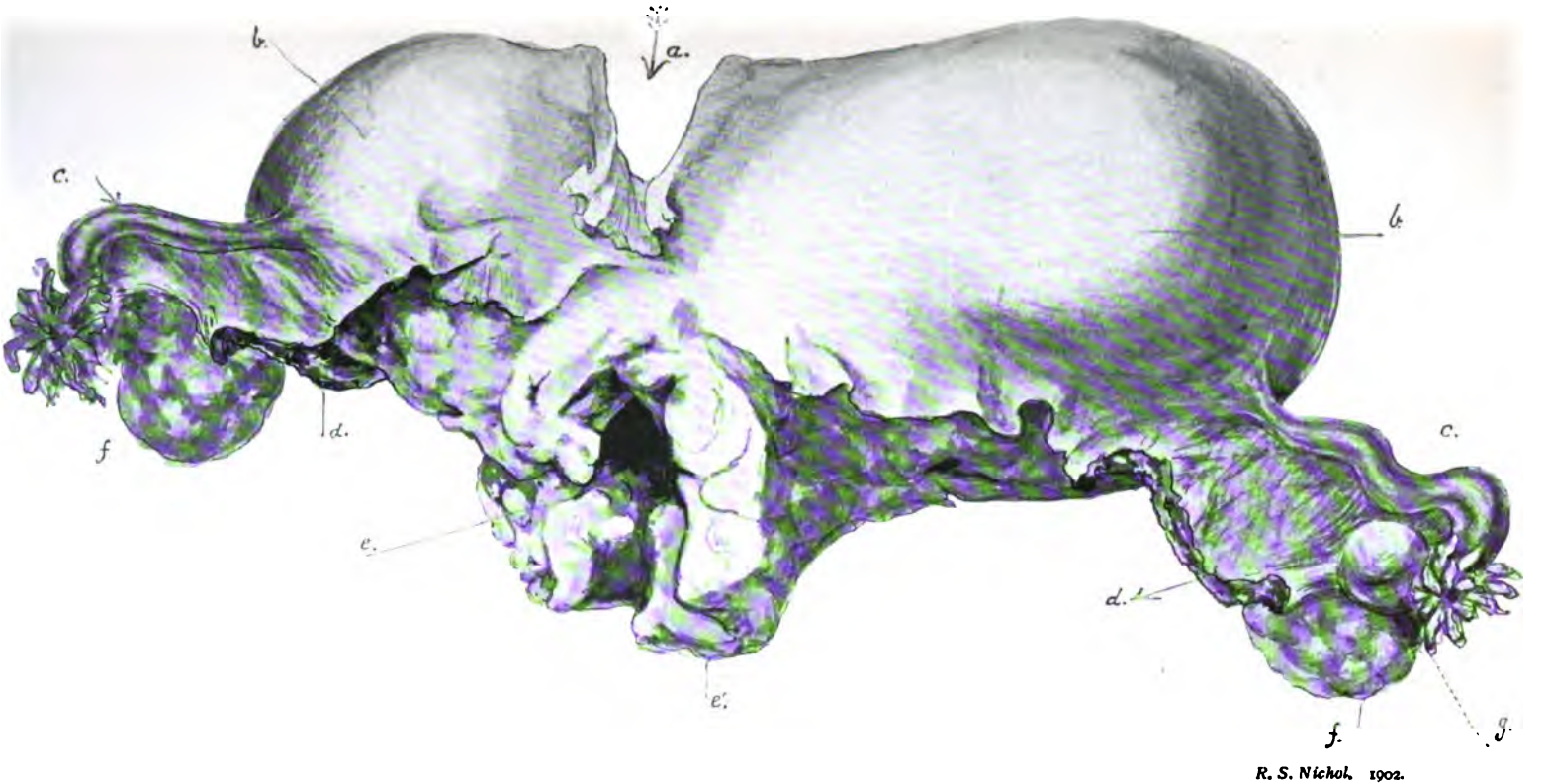
rupture the uterine tissues were thinned out like a sheet of paper; in fact at certain points the peritoneal coat of the uterus seemed to be the only one left. There were portions of fœtal membrane adherent to the peritoneum of the abdominal wall and to coils of intestines. There was a considerable quantity of blood in the abdominal cavity, and the lower rupture of the uterus was found to involve the right broad ligament. As the only safe course seemed to be removal of the uterus, panhysterectomy was performed. The ligatures from the broad ligaments were left long and pulled into the vagina, and a gauze drain was passed from the pelvis into the vagina. The patient stood the operation well, although her pulse was about 130 to 140 nearly all the time that it lasted. After the operation she rapidly rallied and made an uninterrupted recovery. The vaginal dressings were removed on the eighth day, and the ligatures were pulled away at the same time.

The case is brought forward as illustrating a possible — if rare—complication of pregnancy in a double uterus. It is impossible to say definitely when the actual tear in the tissue between the two horns occurred, but it must have been either before the commencement of labour, or just at the time when the pains came on. The occurrence was not marked by any shock or pain, as the tear occurred in tissues which were already thin and non-vascular. If the tear in the cervix and broad ligament had not occurred, it is not likely that any operative interference would have been required after the delivery of the fœtus.

EXPLANATION OF PLATE X.

*a*. Gap between the two horns, covered only by peritoneum. *b. b*. Fundus covered with peritoneum. *c. c*. Fallopian tubes. *d. d*. Cut edges of broad ligaments. *e. e'*. Ruptured cervix; at *e*. part is missing, and the rupture extends into the right broad ligament, in a more or less horizontal plane. *f. f*. Ovaries. *g*. Ovarian cyst.

# Plate X.




R. S. Nichol. 1902.

*Double Uterus with Rupture of Cervix and Mal-development of Fundus (anterior surface).*

# SOME RECENT WORK ON SURGICAL AFFECTIONS OF JOINTS.

By ALBERT CARLESS, M.S. (Lond.), F.R.C.S.,

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## DISEASE OF THE HIP-JOINT.

Disease of the hip-joint is not usually very difficult to recognise, although every now and then cases present themselves in which an exact conclusion can scarcely be reached at once. But after locating the trouble, another step needs to be taken by the careful practitioner, viz., to decide what type of coxitis is present. Several papers of importance dealing with the diverse *varieties of hip-disease* have recently been published and are worthy of note.

Lovett (*Boston Med. and Surg. Jour.*, August 14, 1902) discusses the ultimate diagnosis of 95 cases of hip-trouble which were treated in the Boston Children's Hospital in the years 1897 and 1898, the investigation connected with this inquiry being made in the years 1901 and 1902, so that the later history of the cases might be ascertained. Of the 95 cases, 7 were obviously old-standing tubercular lesions and of no interest in the present inquiry. In 8 cases the data for forming an accurate conclusion were not obtainable, owing to the number of attendances of the case being too small, but probably several of them were tubercular. The remaining 80 cases were divided into 3 groups :—

1. Recovery occurred after a transitory affection in 21 instances. Of these, 7 were at first considered to be undoubtedly of a tubercular nature, and another 7 were looked on as probably tubercular. Recovery occurred in from 1 to 4 weeks in 10 cases, and in from 2 to 4 months in 5 cases; rest in bed was the main element in treatment, and in only a few instances was apparatus required. The recovery appears to have been complete, and that in spite of the character of the symptoms on their first onset. Muscular atrophy of marked degree and severe muscular spasm, loss of the gluteal fold, pain in the knee

apparent shortening and fixation with deformity were all present, whilst night-cries were also noticed in some instances. Lovett's conclusions as to the pathology of these cases is somewhat halting, but rheumatic and traumatic forms of synovitis are suggested, as also epiphysial hyperæmia; aborted tuberculosis is thought possible in some. If only the immediate and early symptoms had been considered, 14 of these cases would have been diagnosed as tubercular, and statistics based on such a conclusion would have been quite inaccurate.

2. In 14 cases, some serious affection, not obviously tubercular, was present. The original diagnosis was hip-disease of tubercular origin in 11 cases, and (?) tubercular coxitis in 3. The final conclusion reached after careful watching and treatment was that 2 of them were due to infantile paralysis, 2 to acute osteomyelitis, one to coxa vara, probably 2 to arthritis deformans, while the remainder were of uncertain origin.

3. Forty cases were of true tubercular coxitis, and in all of them the original diagnosis was verified by later observations. An examination of the clinical manifestations in these cases shows that comparatively few additional features were present beyond those noted in the first group; and thus it is evident that the signs usually taught as characteristic of tubercular disease only indicate an affection of the hip-joint, and in no way suggest its nature. Possibly a thickening of the great trochanter is the most marked and valuable differential point, whilst radiography is also useful.

The subject of *Acute Arthritis and Osteomyelitis of the Hip* forms the basis of three valuable papers by A. Broca, Delanglade of Marseilles, and Barbarin in the *Revue d'Orthopédie* (July, September, and November, 1902); and the question as to the differential diagnosis of various types of hip-disease necessarily arises. The authors divide the acute cases into two groups, according as suppuration is, or is not, present—a sufficiently important basis of division, in that operation is required in one group and not in the other.

I.—*Non-suppurative Arthritis*, often called rheumatic, covers quite a number of different conditions, the nature of which is even yet not fully understood. Naturally, one does not include as worthy of special attention cases in which the hip-joint participates with others in an acute rheumatic attack; it is

only when the lesion is monarticular that it is specially interesting. In the first place, a group of cases is reported in which the coxitis appeared with a sudden onset, well-marked pyrexia, and great pain ; in several there was a distinct history of injury a few days before the attack commenced, but in none of them was there muscular atrophy or enlargement of the inguinal glands, which the author looks on as characteristic of coxo-tuberculosis. All these cases recovered completely in a short time (measured by days) with rest and extension, and were subsequently free from limitation of movement. In another group of cases the onset was gradual, the course usually apyrexial, and yet total recovery ensued after rest and extension had been applied for a short time. In one such case, a boy of eleven years was brought to hospital with a history that eight months previously he had been seized with severe pain in the hip, which after lasting a few days disappeared. The boy subsequently dragged the leg a little, and experienced similar pains from time to time. On admission he complained of severe pain in the right hip, increased by any movement ; and the limb was flexed to an angle of 45°. The temperature was 39° C., but there was no muscular atrophy. The pain gradually subsided, and in a week's time continuous extension was applied. In twelve days all the symptoms had subsided, and in a month's time the patient was discharged completely cured, and with no limitation of movement. No recurrence followed. The explanation of these cases is difficult, but the authors suggest that they are due to an osteitis *de croissance* in the neighbourhood of the growing end of the femur. It is well known that in growing children foci of pain and tenderness appear about the epiphyses, and may be associated with a certain amount of fever. This congestion or inflammation can be recognised easily in accessible regions, such as the tuberosities of the tibia, or in the posterior part of the os calcis. It is not difficult to understand that, should such a condition obtain in the neighbourhood of the upper epiphysis of the femur, it could very readily light up an acute synovitis, which would disappear under treatment in a few days. The authors of this paper claim that the condition is not at all uncommon, and controvert the statement of Lovett that a simple acute synovitis of the hip is rare in children.

II.—*Suppurative Arthritis*, dependent on acute osteomyelitis of the upper end of the femur, is a well-recognised affection. The mischief starts on the shaft side of the conjugal cartilage, and involves the joint because it is intra-articular. It must be remembered, however, that the ossification of the head does not commence until the second year, and that the centres for the trochanters appear in the third and eighth years respectively. It is therefore possible, though rare, for an osteomyelitis of the upper end of the femur to occur without articular trouble, if the mischief chiefly spreads down the bone; and one case of this nature, confirmed by autopsy, is reported, whilst a second without that confirmation is also alluded to. The upper end of the femur is a favourite site for osteomyelitis in young children, but becomes less common as age advances. The joint is usually infected, and various results are noted. Amongst them is abscess-formation, the usual situation being behind. Occasionally, spontaneous backward dislocation occurs, due to the increase of intra-articular pressure, and to softening of the ligaments, the round ligament going first, and then the posterior part of the capsule. It is interesting to note the difference between the displacements of the head in acute and in tubercular arthritis: in the former it is usually, though not invariably, a true dislocation; in the latter it is usually a pseudo-dislocation, due to erosion of the posterior lip of the acetabulum and enlargement of that cavity, allowing the head of the bone to travel gradually upwards up on the dorsum ilii. Another occasional result of osteomyelitis is separation of the head, which remains in the articular cavity and may necrose, whilst the diaphysis is displaced backwards.

Some interesting remarks are also made as to the influence of the Y-cartilage of the innominate bone in the production of suppurative arthritis. It is always intra-articular, but it seems possible that the infective lesion might be mainly directed to the pelvic side: and a case is reported in which an intra-pelvic abscess formed, probably from this cause, without invasion of the joint. Rectal examination in doubtful cases of this type should always be made. The cartilage disappears by the fifteenth or sixteenth year, and therefore all cases of cotyloid osteomyelitis occur before that age. The epiphysis of the head does not unite till later, the ossification

taking place from behind forwards between the ages of 18 and 22 years.

The condition of the Y-cartilage also has an influence in the production of *Perforations of the Acetabulum in Coxo-tuberculosis*, which have been studied by Grosjean of Berck (*Tuberculose Infantile*, April 15, 1902). That they are not uncommon is evident from the figures published by Menard, viz., that, of 235 cases, perforation occurred in 100 instances; whilst Vincent of Lyons reported 12 perforations out of 52 cases; and Ollier and Haberern state that in a third of all bad cases of coxalgia the acetabulum will be found perforated. In the old days, before treatment by extension was fully comprehended, the head of the femur was known to have escaped through the perforation into the pelvic cavity, but this rarely, or never, happens now. The cause of the mischief is either ulceration from pressure of a carious head, or a true bacillary infection; in the latter case it may be primary. The site of the perforation usually corresponds with one of the arms of the Y-cartilage, and especially so when the head is displaced upwards, owing to the existence of what is called the "travelling acetabulum," so that tubercular granulation-tissue is able to collect in the lower part of the socket. Sometimes the perforation is simple, and intra-pelvic mischief is prevented by a thickening of the periosteum and the aponeurosis over the obturator internus; this occurs in about half the cases. In others a small focus of mischief is found on the pelvic aspect, communicating through the perforation with the articular trouble—the so-called collection *en bouton-de-chemise*. More serious still is the condition when an intra-pelvic abscess of considerable size forms, and is perhaps associated with extensive pelvic mischief. Such an abscess may follow the course of the obturator internus tendon and point through the sciatic foramen; or may burrow downwards and open by the side of the anus in the ischio-rectal fossa; or may track upwards and point on the inner side of the femoral vessels below or above Poupart's ligament. It must be remembered, however, that every intra-pelvic abscess in hip-disease is not necessarily of this type, since it is possible for abscesses of extra-pelvic origin to find their way inwards, *e.g.*, up along the adductor muscles and over

the pelvic brim, or even through the sciatic or obturator foramina.

The diagnosis of acetabular perforation is by no means easy, but help may be derived from a rectal examination, which should be resorted to in all cases which are not doing satisfactorily. The question of treatment is scarcely mentioned by Grosjean, except that the opening in the acetabulum must be enlarged, if necessary. Such a proceeding of course involves excision of the caput femoris, but seeing that this course is never to be adopted, if practicable, it is clear that treatment may not be required until an abscess has formed, and then there is no reason why the usual course should not be followed, viz., tapping, or opening and washing out, followed by the injection of the iodoform-glycerine emulsion. I have followed this course with good results. Should, however, the case have become septic, more serious operative measures may be required (*vide infra*).

The *treatment of tubercular disease of the hip* has not called forth many recent communications of importance. In our own columns Mr. G. A. Wright has discussed the present position of this question (PRACTITIONER, July, 1902); but, himself an advocate of early excision, he has perhaps scarcely sufficiently emphasised the modifications in practice that have occurred of late, in the substitution of minor methods for that of excision. The operation is certainly becoming much less common, and many cases that formerly one would have dealt with in this way are satisfactorily treated by other means. In THE PRACTITIONER for July, 1901, I made some general remarks as to the principles guiding us in the treatment of surgical tubercular disease, and pointed out there that, although theoretically excision of the tuberculous focus is most desirable, yet sundry disadvantages might ensue. Certainly in dealing with the hip-joint, the operative disabilities that follow excision are very considerable. Shortening of the limb always follows, and is due to several causes, including displacement of the bone upwards and backwards and interference with its growth, whilst adduction of the leg sometimes occurs, necessitating a compensatory tilting of the pelvis upwards, in order to maintain the parallelism of the limbs. Several cases have been admitted to my wards recently which have illustrated

these points very excellently. Moreover, a certain instability of gait is almost always present, which seriously hampers the patient. Personally I must admit that excision of the hip seems to me a most undesirable proceeding, and that every effort should be made in order to avoid having to undertake it. In not a few cases limited operations can be utilised with every prospect of success. Recently a small child under my care was evidently the subject of a progressively destructive morbus coxæ; an abscess formed in the gluteal region, and this was treated by tapping, lavage, and the injection of iodoform-glycerine emulsion with complete cure of the condition. The hip, however, still continued painful; the thigh was swollen; starting-pains at night were very prominent; and therefore I decided to operate. The joint was opened from the front, and a considerable amount of necrotic granulation-tissue with some puriform fluid escaped. The interior of the articulation was curetted and washed out with sterilised salt-solution; the head was carious, and certainly a few years ago I should have excised it. However, I managed to get my finger over the top, since the acetabulum was enlarged, and to introduce a flushing curette, with which a considerable portion of the lining membrane of the cavity was removed. Finally, I filled the joint with the iodoform emulsion, stitched up the incision in the capsule, and closed the wound. The case did remarkably well, the wound healing soundly; and in a few weeks the child was able to go home with the limb in a Thomas's splint. All pain and swelling had subsided. The advantage that the child will obtain from the presence of the head of the femur in the acetabulum will be very great; ankylosis in a good position will, I trust, take place, and thus most of the disabilities that follow excision will be avoided. In another case I removed a sequestrum from the under side of the neck, and curetted the adjacent portions of the head and neck, but left the convexity of the head in the acetabulum. These are merely examples of what many surgeons are doing at the present day instead of performing the old-fashioned mutilation known as excision. Of course the typical operation has sometimes to be undertaken, especially in adults.

When the acetabulum is seriously involved and minor conservative measures do no good, the patient suffering from the

retention of discharges (often septic), which cannot effectually drain away—a small ineffectual opening possibly being present in the rectum or ischio-rectal fossa, or a long, sinuous track having formed in one of the situations alluded to above—then it may be absolutely necessary to make some provision for direct drainage from the acetabulum. Even here it is not always necessary to follow the old-fashioned rule and perform an excision. Bradford (*Annals of Surgery*, Oct., 1902) relates three cases in which it sufficed to open the joint (he did so from the front, back, and side respectively in the three cases), and dislocate the head of the femur, placing it on the dorsum ilii. The acetabulum was then curetted, and touched with pure carbolic acid, and a large celluloid drainage-tube was introduced down to it. The result was at once evident, the patient' stemperature falling, and the weight increasing. One case passed out of sight at an early date, but the other two were watched for a long time. Naturally in septic conditions, such as these, the tubes had to be retained for many months; but the patients were soon able to get about on crutches, and their general condition became more satisfactory. The only alternative would have been amputation through the hip-joint, and Bradford considers that such would have been more mutilating. Personally I doubt whether the latter proceeding would not have been the better. The limb in such cases would be of very little use, and my own experience goes to demonstrate how wonderful is the improvement in many cases when the limb is completely removed.

Still more heroic measures have twice been undertaken for very exaggerated disease of the innominate bone associated with hip-disease, in the shape of an *inter-ilio-abdominal amputation.* The operation has recently been discussed by Savariaud (*Revue de Chirurgie*, Sept., 1902), who tells us that 13 cases in all have been performed with nine deaths and four operative recoveries, *i.e.*, with a mortality of 68 per cent. Eleven cases of osteo-sarcoma of the innominate bone were operated on with eight deaths, and twice the proceeding has been undertaken for hip-disease with one recovery. The successful surgeon was Bardenheuer, who reported the case at the German Surgical Congress, 1897. Two lateral flaps were cut, a large external and a small internal, reaching down from just below

Poupart's ligament. A third incision above and parallel to Poupart's ligament enabled the external and internal iliac vessels to be reached and tied. The thigh was then removed at the hip-joint, and the innominate bone was freed, after the rami of the pubes and ischium had been divided by a Gigli saw, the sacro-iliac joint being opened from the front. Savariaud recommends a large internal flap containing the main vessels, the horns of the incision being united by another following the crest of the ilium. The abdominal muscles are freed from the bone, and the external and internal iliac vessels are thereby easily reached. The pubes and ischium are divided in front, and the leg is used as a lever to assist in opening up the sacro-iliac joint behind.

Amongst the many complications which may arise in hip-disease is one to which but little attention has been given, viz., *Infection of the Ilio-psoas bursa.* Lund devotes a paper to the consideration of this structure (*Boston Med. and Surg. Journ.*, Sept. 25, 1902), but does not mention its implication in tubercular disease. The best anatomical description of it is given by Tillaux in his "Anatomie Topographique" (page 968), who points out that it is often of considerable size, runs a certain distance above the ileo-pectineal eminence, and sometimes communicates with the hip-joint. "Collections of fluid within it give rise to a deep-seated tumour which lifts up the femoral vessels, and the diagnosis of which is attended with certain difficulties." Lund examined the thigh in 18 subjects in the Harvard Medical School, and found that the bursa communicated with the hip-joint by a free opening in three, but no connection could be traced in the others. In about half the cases the bursa extended above the pelvic brim. He reports three cases in which it was involved secondarily to hip-disease, caused respectively by gonorrhœal arthritis, osteo-arthritis, and acute suppurative arthritis. In each of them the symptoms due to the bursal trouble dominated the clinical picture. He recommends that the bursa should be reached by an incision passing vertically downwards just below Poupart's ligament, between the anterior crural nerve and the femoral vessels. That it may also be involved in tubercular disease occasionally is obvious, and by a curious coincidence two cases in which it was thus affected were recently operated on by me on the same

day. In one of them the patient, a man aged 44 years, presented himself with pain and limitation of movement in the hip-joint, and with a diffuse swelling of the upper part of the thigh, which led to displacement forwards of the femoral vessels to such an extent that, when he was lying in bed, the pulsation of the artery was very easily seen. At first the swelling led one to suspect an abscess connected with the horizontal ramus of the pubes, or an osteo-sarcoma, but on exploration nothing was found. Subsequently the articular phenomena led to an examination of the hip-joint, which was so extensively diseased that an excision was performed. Later on, the bursal symptoms became more active, the temperature rose, and finally, through an incision on the outer side of the nerve, the abscess was reached and found to be of great size. The lesser trochanter was very obvious, and the abscess had burrowed amongst the adductor muscles, necessitating a counter-opening on the inner side in order satisfactorily to flush it out. In the second case, a child, aged six years, was brought to hospital with a septic sloughy-looking sinus with undermined skin in the region of the saphenous opening. This was at first thought to be merely glandular in origin, but on later investigation it was discovered that the abscess had burrowed up from the deeper parts, and plainly had originated in the ilio-psoas bursa. The capsule of the hip-joint was defective on this side, and on exploration through another septic sinus just in front of the great trochanter, a tubercular sequestrum was removed from the under side of the neck of the femur. I have also seen a third case of implication of this bursa in the practice of Prof. Rose, a case of hip-disease being complicated by a psoas abscess, which had burrowed up into the abdomen, there being no sign of any associated disease of the vertebræ.

On the whole I am not inclined to agree with Dr. Lund's advice that the bursa is most easily reached by the incision he recommends. In the first place it is undesirable to place a drainage-tube between the femoral artery and the anterior crural nerve; whilst, in the second place, in not a few cases it would certainly be easier to reach the swelling on the inner side of the femoral vessels, in the site where an abscess connected with this bursa usually tends to point.

DISEASE OF THE KNEE-JOINT.

The problems which confront the surgeon in dealing with *Tubercular Disease of the Knee* are of quite a different character. The best that one can expect, except when the case comes under observation at quite an early period, is ankylosis in a good position; and it is a serious question as to whether one ought to wait for such to develop, or should rather step in and determine a favourable issue by excising the articulation. In the first place it is universally admitted that excision is an operation that should be avoided, if possible, in children. The results are rarely good, since the epiphysial cartilages are almost certain to be interfered with, and growth either ceases, or is modified to such an extent that the synostosed knee becomes subsequently flexed or over-extended. In the adult, where growth has ceased, this element need not enter into consideration. The question as to whether one should excise early in adults, or merely keep the operation as a *dernier ressort*, is therefore to be settled on other issues. A general impression exists amongst many that an ankylosed knee, the outcome of a natural process of repair, is as good and satisfactory as one synostosed as the result of excision. Gibney of New York (*New York Medical Journal*), July 26, 1902) strongly controverts this statement, and points out that the ankylosis is often only partial, whilst tuberculous foci may be encapsuled, and give rise to recurrent attacks of pain and swelling, which make the patient distrustful of the leg, and lead him to cling tenaciously to some fixing apparatus, such as a back splint, which he continues to wear through life. He illustrates this by recording two cases, in which, although no active trouble had been evident, yet on excision small necrotic areas were found, and abscesses extending into the bony tissue. Complete healing had been obviously prevented by these, whilst excision gave satisfactory results in a comparatively short time. A very similar conclusion is reached by Lucas-Championnière (*Journal de Médicine et de Chir.*, June 25, 1902), who reports on 115 cases of excision of the knee without a single death. In the first place he raises the point as to whether absolute immobilisation is beneficial as a routine method of treatment in all cases of tubercular disease of joints. He admits its value as a means of relieving pain, and

of preventing or remedying deformity, but at the same time points out that it seriously impairs the nutrition of the limb, and in this way may actually hinder the reparative processes in synovial membrane or bone. Some slight movement of the joint, guarded from being excessive by apparatus, will maintain the tone of the muscles, assist in the nutrition of the limb, and not hinder the curative process; and, if cure is successfully accomplished, it will lead to a better result, in that the joint is moveable. In the earlier stages, then, he trusts to the local application of counter-irritants, especially the actual cautery; to wrapping the limb in a modified Scott's dressing, containing lead as well as mercury; and to the prolonged internal administration of iodide of potassium. If residence at the sea-side can be superadded, so much the better. Abscesses are to be treated by tapping, and the introduction of iodoform dissolved in oil.

Operative treatment in children must, of course, be limited by the necessity for preserving the growing cartilages, but the question in the adult is quite different. "In the adult, or in the adolescent where growth is nearly at an end, there should be no hesitation, if the future movement of the knee is compromised; excision must be undertaken"; and exactly the same reasons, as are adduced by Gibney, are given to enforce this absolutism. To be able to record 115 cases without a single death is indeed satisfactory. The nearest death to the time of operation was at an interval of five months, and that was due to pulmonary tuberculosis following a local relapse, which necessitated amputation. A second case also died, five months after excision, of some condition quite unconnected with the operation. Lucas-Championnière lays great stress on the importance of completely removing all the tuberculous tissue. Neither periosteum nor ligaments must be respected, and sub-periosteal resection is quite negatived. The amount of shortening of the limb is usually from 5 to 7 centimetres, although occasionally a little more.

Ogilvy of New York (*Post-graduate* Oct., 1902) lays special emphasis upon the treatment of the earlier stages, endorsing the necessity for rest and for the removal of all pressure upon the articular surfaces. It is not sufficient, in his opinion, to immobilise the joint and allow the patient to walk about upon

the leg. The separation of the joint-surfaces is an important addition to rest-treatment, and this can be combined with the use of a Thomas's knee-splint without much difficulty. Moleskin adhesive plaster is attached round the leg, and is on either side united by buckles to extension-straps fixed to the foot-piece; counter-extension is obtained from the perineal ring. The patient has a patten applied to the sole of the other boot, and walks on crutches. In this way all jarring of the limb is prevented.

Mencière of Reims (*Archives Prov. de Chir.*, Oct. 1, 1902) condemns most emphatically the usual method of treating tuberculous joints by rest and fresh air, which he stigmatises not only as insufficient when means are to hand of acting directly on the tuberculous tissue by curative measures, but also as absurd. The plan he advises consists in two distinct elements, viz., the intra-articular and interstitial injection of a solution of iodoform in ether, and the injection into the centre of the epiphyses of liquid carbolic acid, which has according to him an elective action on bony tissue; to this latter proceeding he gives the title *Pheno-puncture.* His method of proceeding is as follows :— A small incision is made down to the bony wall of the epiphysis by a special lancet; through this opening is introduced a drill with a spiral groove, which is forced into the centre of the epiphysis. A tube-like metal protector is then placed so that its lower end fits exactly into the opening in the bone, and through this carbolic acid (90 per cent. with 10 per cent. of alcohol) is instilled into the bony tissue by means of a pipette. The acid is allowed to act for a minute or two, and then the wound is freely washed out with absolute alcohol, which soaks up any excess of acid; the wound can be closed by a single suture. In the latter stages Mencière does not hesitate to open the joints freely, curette the epiphyses, if need be, and apply the carbolic acid; or to puncture them and instil the acid, whilst the synovial membrane is washed freely over with the acid and then subsequently with alcohol. He speaks very enthusiastically of the results which he has obtained, but gives no statistics. The method is apparently an outcome of a suggestion made by Phelps of New York at the International Congress at Paris in 1900, and certainly seems worthy of a more extended trial than has yet been granted to it.

## ARTICULAR LESIONS OF HÆMOPHILIA.

The Articular Lesions of Hæmophilia form the substance of a valuable symposium by Poillet of Lyons (*Gazette des Hôpitaux*, April 5, 1902). It appears that the affection is mainly confined to the Northern races, 106 occurring in Germany, and 58 in England, out of 252 which were available for analysis. The joint-trouble necessarily follows the sexual limitation of the causative disease, *i.e.*, it is practically always found in the male sex. The trouble commences early in life, most commonly between the fourth and sixth years, but occasionally earlier. Traumatism seems to play but a slight part in its production, as the bleeding may occur when the child is quiet in bed. The knee is attacked in about half the cases, the elbow in about a fourth, and the ankle comes next in frequency. It is not unusual for several joints to be involved in the same subject. König's original description of the affection in three stages may well be adhered to. At the outset the joint becomes distended with blood, which occupies all the pouches; and this is associated with a feeling of tension on movement, and of pain without localised tenderness. The skin, though stretched, is not red, hot, or œdematous, and possibly some signs of ecchymosis may appear in a few days. The effusion is absorbed in a short time, and at first the joint may seem but little damaged. The attacks may, however, be repeated frequently, and involve either the same or fresh articulations. In one case as many as 31 successive attacks of hæmorrhage in a particular joint are reported. In the second stage a chronic form of arthritis is lighted up, the synovial membrane becoming thick and rough, and the periarticular structures infiltrated. Some amount of passive effusion can be constantly detected, and the neighbouring muscles are atrophied. As a result of repeated attacks, unless precautionary measures to prevent it have been taken, the joint passes slowly into the third stage marked by loss of function and deformity. This is mainly due to the proliferation of periarticular connective tissue, whilst nodular outgrowths at the joint-margin of a fibrous nature are not uncommon. On opening such a joint, no special pathological changes are evident, except that the synovial membrane and perhaps the articular

cartilages, or what remains of them, are discoloured with blood-pigment, and that there may be a covering of a fibrinous character more or less organised, and perhaps with vascular tufts projecting. The prognosis of hæmophilia *per se* is bad, 60 per cent. of the cases dying before the age of 8 years, and only 11 per cent. reaching the age of 22; but curiously the children affected with arthritis do not have such a great mortality. As to treatment, the chief indication is to abstain from all operative measures. Not a few have been dealt with by incision, and four out of five have died. Not even a puncture to relieve the articular engorgement is justifiable. The limb must be immobilised with gentle compression and the application of ice. Massage, too, is inadvisable, as it might suffice to light up bleeding. Nothing new as regards general treatment is suggested.

### PNEUMOCOCCIC ARTHRITIS.

Quite a number of papers have been recently published dealing with this subject. Cave of Bath (*Lancet*, Jan. 12, 1901) collected 31 cases for commentary, but since then Herrick of the Rush Medical College (*American Journ. of the Med. Sci.*, July, 1902) has been able to add another 20 cases, and Cole of Baltimore (*American Medicine*, May 31, 1902) two more. The question as to its occurrence in the course of the broncho-pneumonia of children has received attention from Bichat and Goepfert (*Rev. mens. des Maladies d'Enfance*, August 1902). The condition is obviously a rare one, Herrick only finding two instances reported out of 2,292 cases of pneumonia collected from various German sources. Netter out of 4,156 cases of pneumonia only discovered 6 cases. On the other hand, Raw of Chicago has lately reported its occurrence in 1 per cent. of his cases, but as they were mainly in alcoholic patients, and as this is admitted to be a predisposing factor, possibly his high percentage is thereby explained. Perhaps, however, we shall find that it is more common than was at first suspected, when routine examination is made for it. Males are much more frequently affected than females, in the proportion of 40 to 7. The distribution is pretty equal in both limbs, though perhaps a little more common in the upper. The knee-joint is that most often involved, the lesion occurring here in about 30 per cent. of the whole. The trouble was

monarticular in about 61·5 per cent. of the cases, and it is the knee, shoulder, elbow, and wrist that are most often attacked. The hip-joint is not frequently affected. Traumatism has apparently a direct influence in determining an attack, and it is especially liable to be located in a joint previously damaged. The trouble does not always follow an attack of pneumonia, mischief in the throat and ear being sometimes responsible for it. The infection is not always purely pneumococcic, but ordinary pyogenic organisms may be present in addition. The result is an acute purulent arthritis with no special local characteristics; but the prognosis is always serious, in that it is an evidence of the invasion of the system by the pneumonic microbes. As a fact, of the 52 cases collected by Herrick not fewer than 34 died, giving a mortality of over 65 per cent. It is strange that pneumococcic affections of various structures in the body differ so much in prognosis. A pneumococcic empyema has a good prognosis, and localised abscesses in the connective tissues do well; but when the meninges are affected, or when joints are attacked, the mortality is always high. As regards the treatment of this affection, it must be early and thorough, incision and drainage being the important elements, although it is desirable to damage the joint-structures as little as possible by unnecessary manipulation.

# DISEASES OF THE UPPER AIR-PASSAGES:

## A REVIEW OF RECENT WORK.

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### PARAFFIN-INJECTION FOR NASAL DEFORMITY.

THE subcutaneous injection of paraffin for the correction of saddle-nose promises to be of real value in the repair of this deformity. It is the first device with this object that I have felt able to recommend to the readers of THE PRACTITIONER, though for many years past I have kept them informed of the various efforts which were being made in this direction. Most of them hailed from America, and consisted of the subcutaneous introduction of metallic or celluloid bridges. None were satisfactory. The repair of the bridge by the transplantation of bone from a recently-killed rabbit was devised by Watson Cheyne,[1] and proved very satisfactory; but the subcutaneous introduction of solid hydrocarbon not only produces an æsthetic result equal to that of any other method, but promises to be so simple and free from risk that its employment will become general.

It was in 1900 that Gersuny[2] of Vienna first suggested the use of vaseline for this object, but as it has a relatively low melting-point (38–40° C. = 104° F.) there were obvious objections to its use. These were overcome by Eckstein by employing a paraffin with the much higher melting-point of 65° C.

*The objections to the vaseline* employed by Gersuny are that:—

1. Its low melting-point makes it possible for the injected mass to become fluid when the patient is feverish.

2. It may cause pulmonary embolism.

3. It tends to spread into the neighbourhood of the injection, instead of solidifying quickly on the spot.

[1] Clinical Society's Trans.

[2] *Zeitschrift für Heilkunde* 1900. Band I., Heft 9.

4. It tends to be slowly re-absorbed. Neumann states that in every case the injected mass disappears in two years.

The paraffin of Eckstein is free from these objections. Introduced at a temperature of about 60° C., into a body at 37° C., it solidifies so rapidly that there is no chance of its shifting its position, or giving rise to embolism. On the other hand, it has the drawbacks incident to its higher temperature:—(*a*) The heat at which it is introduced may give rise to some reaction. (*b*) The high melting-point necessitates the use of special appliances for keeping it at nearly 60° C. (*c*) The rapidity with which it solidifies leaves the operator very little time—not more than 15 to 30 seconds—for modelling the nose into shape.

Let us consider what has been the experience of various experimenters. Scanes Spicer[1] appears to have been the first to adopt the method in this country. The condition of the nose on which he tried it is well shown in Fig. 1, the drawing of a plaster cast made the day before operation, where the crescentic wrinkles from eye to eye over the bridge of the nose are well marked. The paraffin used melted at 40° C. (104° F.). There was no pain, though the nose looked a little tense and brawny. No paraffin passed into the eyelids, apparently, at the time, and no pain or inflammation followed; but in a few days the upper eyelids became somewhat œdematous-looking. This condition has remained, and so has a small nodule of paraffin which wandered into the left upper eyelid. Fig. 2 shows the excellent result, so far as the aspect of the nose is concerned, and this result was maintained ten months afterwards.

Stephen Paget[2] used the method in two cases, using about 2 c.c. of paraffin, in one case with a melting-point of 130° F., and in the other with a melting-point of 115° F. He found the former difficult to manipulate, as the syringe must be kept so hot that it can hardly be handled except with gloves. He points out that, whatever be the melting-point of the paraffin, it must be kept, during use, 10° or 15° higher, or it will solidify in the needle before it can be injected.

[1] *The Clinical Journ.*, April 9, 1902.
[2] *Brit. Med. Journ*, Sept. 13, 1902.

## Plate XI.

Fig. 1. *Cast of Nose before treatment (Scanes Spicer).*

Fig. 2. *Cast of same Nose two months after injection of paraffin (Scanes Spicer).*

Fig. 3. *Syringe used by Walker Downie.*

For the loan of the blocks of Figs. 1 and 2 we are indebted to the courtesy of the Editor of *The Clinical Journal*.

Fig. 4.
*Before treatment.*

Fig. 5. *After injection of paraffin (Walker Downie).*

Fig. 10.
*Before treatment.*

**Fig. 6.**
***Before treatment.***

Fig. 7. *After two injections of paraffin (Walker Downie).*

Fig. 11.
*After two injections of paraffin (Walker Downie)*

**Fig. 8.**
***Before treatment.***

Fig. 9. *After injection of paraffin (Walker Downie).*

A. J. Martineau[1] employed a general anæsthetic, but thought it probably unnecessary. The paraffin used had a melting-point of 110° F. About 30 minims were injected.

Walker Downie[2] has had considerable experience with a paraffin melting between 104° F. and 108° F. To prevent this solidifying in the needle he devised the following plan. The proximal half of the ordinary needle of an antitoxin-syringe, including the collar, is bound round with cotton thread for purposes of insulation. Then a piece of fine platinum wire is wound round the needle and its collar, over the thread, each end of which is soldered to a separate copper wire. When these two copper wires are fixed to the terminals of a storage-battery furnished with a rheostat, the platinum wire surrounding the needle may be heated, and the temperature raised or lowered as desired (Fig. 3). A layer of moist carbolised gauze is then wrapped around that portion of the needle so prepared, so that, when the wire is heated by the electric current, the needle is surrounded by what is practically a steam-jacket. This excellent arrangement may always be at hand in a specialist's study, but for everyday practice something more easily worked is desirable.

The whole subject is reviewed by Choussaud,[3] who gives the preference to a paraffin melting at 52°—55° C. (125° F.). He holds that, with a Pravaz syringe and antiseptic precautions, the technique is simple.

Harmon Smith[4] injects about *2* drachms of paraffin at 115° F.

Francis J. Quinlan[5] works at a temperature of 118° to 125° F. He points out that the coagulation of the paraffin is often due to the use of a long needle with a small bore, instead of a short, thick one.

Brœckært,[6] who has had experience of no less than *26* cases, also points out that the diameter of the needle of the syringe should be wide, and that the instrument should be made of silver, with an iridio-platinum tip. He uses a paraffin melting

[1] *Lancet*, Aug. 9, 1902.
[2] *Brit. Med. Journ.*, Nov. 8, 1902.
[3] *Thèse de Bordeaux*, March, 1902.
[4] *New York Medical Journ.*, May 17, 1902.
[5] *The Laryngoscope*, August, 1902.
[6] *Bullet. Soc. Franç. d'Otologie, et de Laryngoscopie*, 1902.

at 50° C. (122° F.), which should not be heated above 60° C. It is indispensable to see that the skin over the sunken bridge of the nose is freely movable; otherwise a subcutaneous bed must first be made for the liquid.

After passing in review these various experiences we are now able to formulate the rules for the operation. As a glass sterilisable antitoxin-syringe, holding 10 c.c., now forms part of every practitioner's outfit, it will serve for this method if furnished with several short needles, with large bore. It is boiled before use, and then left in water as hot as the hand can bear. A paraffin, melting at 115° F., is obtained from the chemist in small pots, each of which contains a little more than the capacity of the syringe. These have been sterilised, and remain hermetically sealed till required for use.

The small pot of paraffin is opened and placed in a hot-water bath, of which the temperature can be gradually raised. A small sterilised thermometer is supported in the paraffin, and when this indicates 125° F. the syringe can be charged with 6 to 8 c.c. A good body of liquid tends to cool less rapidly, but the syringe should not be too full. To prevent as much as possible the rapid cooling of the paraffin, and its consequent solidification in the syringe, the latter should be encased in a large piece of rubber drainage-tube. General or local anæsthesia is unnecessary.

The skin over the nose should have been thoroughly purified beforehand with soap and spirits of turpentine, and a carbolic dressing applied overnight. Immediately before operation, the skin should again be well cleansed and washed with 1-in-20 carbolic.

The patient being seated, an assistant makes pressure around the root of the nose to ensure that the fluid injected will be confined to the nasal region. The needle is then introduced in the middle line, and well below the skin; and sufficient paraffin is injected. The amount will vary with the case, but it is better to err on the side of too little than of too much. The injection should not be made either timidly or too vigorously; but the operator must be prompt, as he has only 15 to 30 seconds to model the subcutaneous mass before it solidifies. If he then finds that it is insufficient, a second injection can be made. The puncture in the skin can be sealed with collodion.

In a few hours some reaction may set in, and the skin remains red for several days before it subsides.

The results are very well shown in the illustrations. In some of Walker Downie's cases the improvement has been maintained for nine months.

It seems to have occurred independently to Lake[1] and Brindel[2] that this method might also be employed for restoring the collapsed turbinals of atrophic rhinitis. In Lake's case the immediate results were very satisfactory, and in five of Brindel's cases (quoted in the *Thesis* of Choussaud) there was no complication. But in two others there was a slight phlebitis or periphlebitis of the facial vein and its anastomoses round the root of the nose. Further experience is therefore necessary in both as to the lasting results, and the precautions to be taken for the submucous injection of paraffin.

## MALIGNANT DISEASE OF THE ŒSOPHAGUS.

Malignant disease of the œsophagus is an affection which cannot be packed into one of the special pigeon-holes in which so many diseases have been distributed. In its early stages it comes under the observation of the family physician; the general surgeon considers it belongs to his province. Many a case is first diagnosed from the reflection in the laryngologist's mirror; the consulting physician often sees cases because of abdominal symptoms; while in not a few instances—as we shall see further on in this paper—the symptoms impel the patient to visit, first, a chest-hospital. With the progress of modern surgery there is hope of cure from the early diagnosis of cancer in almost any part of the body, except the œsophagus. Here, treatment can only be alleviative, but from many points of view the importance of a correct diagnosis is very evident.

The *common history* in most cases—as pointed out by Charters Symonds in opening a debate on the subject at the Laryngological Society of London[3]—is that of a gradually increasing dysphagia. It is rare for external pressure on the

[1] *Proc. Laryngol. Soc., London*, March, 1902.

[2] *Rev. hebd. de laryngol.*, No. 45, Nov. 8, 1902.

[3] *Proceedings*, June, 1902; *Journal of Laryngology*, September, 1902; and *Lancet*, August 9, 1902.

gullet to give rise to dysphagia. Such is the view of Osler; and he is supported in it by Goodhart,[1] who, in all his experience, can recollect only one case of aneurysm of the thoracic aorta in which the patient died from emaciation, like a case of cancer of the œsophagus—as which, indeed, it was diagnosed. In no case of mediastinal tumour alone had he seen a patient die from starvation. Only once has Charters Symonds passed a bougie in a case of aneurysm. The case had been sent with the diagnosis that mediastinal pressure was absent. A bougie was therefore passed, but it was felt to pass over a convexity and smoothly descend the gullet without anv difficulty. Hence it is, as Goodhart says, that symptoms of genuine obstruction in the gullet, even when of the slightest, are of such ominous import.

But the *diagnosis* in many cases is far from easy. The dysphagia in by no means a small number is of sudden onset, *e.g.* at a particular meal; or it may be complained of, and yet—as shown by Dundas Grant at the Laryngological Society's debate—the *causa causans* may be malignant disease in the abdomen, or defective teeth, or other source of reflex irritation. In other cases symptoms of dysphagia may not be complained of, but in their place there is loathing for food, or dysphagia, or pain (this last particularly when the central portion is affected).

This type of case is well described in a recent valuable paper on "Cancer of the Œsophagus without Obstruction."[2] This gives the necropsies in no less than six cases, performed by Dr. J. G. Emanuel while in residence at the Victoria Park Hospital for Diseases of the Chest. Now, it is very striking to recognise that so many cases should have died in a chest-hospital, when we remember that, had the diagnosis of œsophageal cancer been made in the out-patient department, no case would have been admitted to the wards. The cases, in fact, illustrate the point under consideration, viz., that the common symptoms of dysphagia may be altogether absent, or else obscured by the other more prominent symptoms. Summarising the symptoms for which these six cases sought admission, they were as follows:—(i) Epigastric pain, vomiting, and flatulence; (ii) shortness of breath, cough, and expectoration; (iii) loss of voice, stridor, and

[1] *Lancet*, Nov. 8, 1902, p. 1241

[2] J. G. Emanuel, *Lancet*, Oct. 18, 1902, p. 1241.

cough produced by passage of food; (iv) hæmoptysis; (v) aphonia, and cough produced by passage of food; (vi) cough, stridor, and tender lump in the throat. Even in those cases, in which the history brought out some trouble in deglutition, the difficulty was not one associated with trying to get food through a stenosed œsophagus, but was caused by the œsophageal growth perforating either the trachea, the left bronchus, or the lung itself. A "cough immediately after swallowing" suggests a communication between the œsophagus and the air-passages.

Frequently it happens that *laryngeal paralysis forms an early symptom of œsophageal growth.* In the above series the larynx was examined during life in three cases, and in all of them there was bilateral paralysis; in the fourth case the necropsy showed the right recurrent laryngeal nerve to be involved, and in the remaining two cases there was a strong probability that the left recurrent laryngeal was embedded either in the primary growth or in the enlarged glands. Yet in these last three cases no laryngoscopic examination had been made in life, because the true lesion had not been suspected, and laryngeal symptoms were absent. With reference to the latter point it must never be forgotten that a very fair voice may exist not only with unilateral, but also with bilateral, paralysis of the chords. The knowledge of this fact enabled Semon and Tilley at the Laryngological Society's debate to quote instances in which the laryngoscope had guided them to a correct diagnosis, in one case where the symptoms had previously been ascribed to gastric ulcer, and in another to "gouty œsophagitis." Paralysis may not only be produced by pressure on the nerves, but also—when the malignant disease affects the posterior aspect of the cricoid cartilage—by actual destruction of the posterior crico-arytenoid muscle. In this region, also, œdema of the arytenoids and neighbouring parts of the pharynx may be caused by a growth.

*Enlargement of the cervical glands* is another point which may attract attention to the œsophagus, when the dysphagic symptoms are slight or absent.

Obviously, it is very possible for a patient to die of cancer of the œsophagus without the disease having even come under suspicion. This, in fact, was what happened in one of

Dr. Emanuel's patients, who died from pyo-pneumothorax. Still, the very knowledge of the elusive nature of the symptoms should put the sagacious practitioner on his guard. Clifford Beale[1] recalled the story of Astley Cooper, who, after going through the medical wards at Guy's to see some special cases, had his attention called to an old man, sitting up in bed, whose face was obviously suggestive of cancer. Astley Cooper was told that none of the physicians could find out what was the matter, and he instantly replied, "Then he must have cancer of the œsophagus. He obviously has a cancer somewhere, and it is only in the œsophagus that it may give no symptoms."

Supposing attention be attracted to the gullet, a diagnosis can generally be made by asking the patient to swallow liquid. The phenomena, when marked, are characteristic. He makes one ordinary effort, followed by one or more smaller ones; these are accompanied by certain peculiar movements of the neck. Then he brings up a little gas, often hits his chest, and says, "Now it has gone."

The *œsophageal bougie* in these cases is used to settle or confirm the diagnosis, and not for treatment. It should be of fair size, and no force should be used. It will sometimes pass more easily after a night's rest and a dose of opium. The possibility of entering the trachea is not entirely theoretical; and the *coudé* bougie will sometimes detect a stricture, where the ordinary conical one will fail. Of course, the possibility of an aneurysm has previously been eliminated by careful examination.

The *age* of the patient is an important point. The majority of cases occur in males, who are generally past middle age. When the disease occurs in females it is quite common for them to be between 20 and 30 years of age. Of Dr. Emanuel's six cases, five were in males who were all over 50 years of age. The one female patient was only 33.

## THE FUNCTIONS OF THE EPIGLOTTIS.

What are the functions of the epiglottis? The question is not one of mere theoretical interest, but has an undoubted clinical bearing. The old theory, still quoted in many text-books of physiology, and demanded of the unfortunate examinee,

[1] *Laryngol. Soc. Proceedings*, June, 1902.

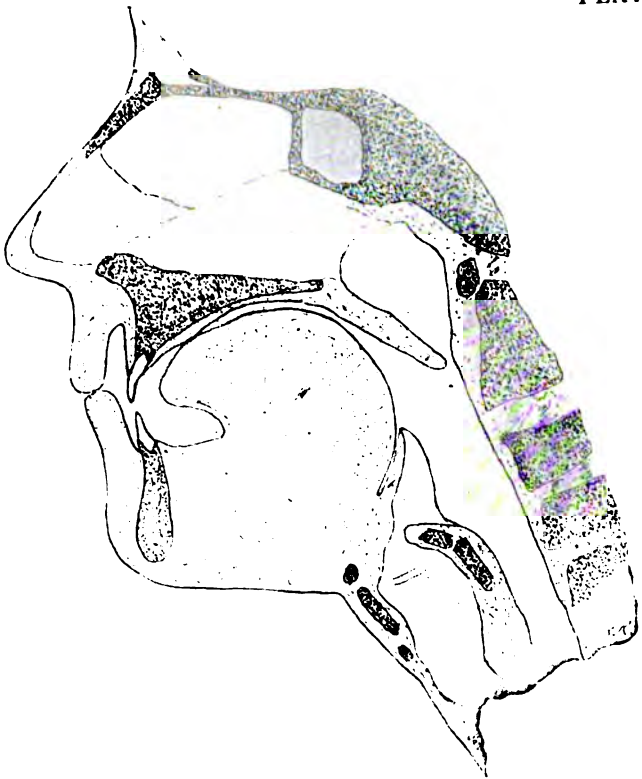

Fig. 12. *Commencement of second stage of deglutition.*

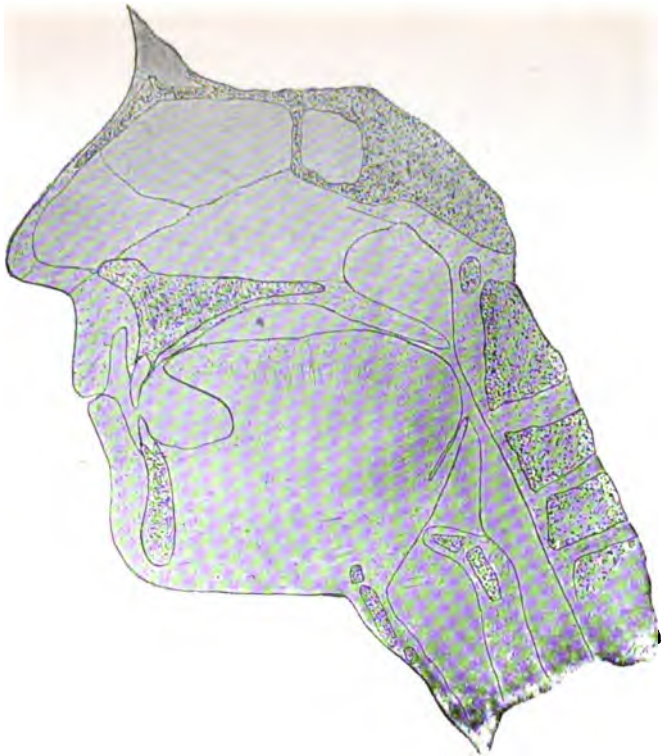

Fig. 13. *Termination of second stage of deglutition.*[1]

[1] For the loan of the blocks of Figs. 4 to 13 we are indebted to the courtesy of the Editor of the *British Medical Journal*.

was that the epiglottis acted as a lid to the larynx, closing down over the rima glottidis during deglutition, so that, while its posterior surface protected the entrance to the air-way, the upper surface formed a channel along which the bolus of food glided into the gullet! This time-honoured explanation overlooked the following objections to its adequacy :—(1) The epiglottis is neither hinged, nor so pliable, as to permit of its being doubled back; (2) there are no muscles capable of bending the cartilage transversely; (3) persons in whom the epiglottis has been entirely removed get along very well without it; (4) it is subject to so many physiological irregularities that frequently it would form a most inefficient laryngeal lid; (5) in cases of poisoning by corrosive acids the only part of the epiglottis found to be eroded has been the laryngeal surface of the petiolus; (6) the experiments of Majendie and Schiff[1] show that coloured fluids when swallowed pass directly into the pharynx, without coming into contact with and staining the upper surface of the epiglottis.

Still, the theory was universally accepted until Anderson Stuart in 1892, maintained that the epiglottis did not fold down like a lid, and that the occlusion depended entirely on the movement of the arytenoid cartilages. This view has been endorsed, and added to, by Knowles Renshaw,[2] whose explanations are based on actual observations by means of the laryngoscope, coupled with a consideration of the anatomical structure of the parts and the modifications in function that result from disease.

In tolerant subjects, the entire movement, as far as the tongue, epiglottis, and arytenoid cartilages are concerned, may be observed with the laryngoscope, except during a very short interval of time immediately after the tongue and posterior pharyngeal wall come into contact. The various movements are as follows :—As the tongue moves backwards towards the pharyngeal wall, the arytenoid cartilages commence to slide inwards and forwards towards the cushion of the epiglottis, and at the same time the entire larynx is lifted upwards and somewhat forwards, thus opening the mouth of the œsophagus (Fig. 12). The epiglottis partakes in this upward lift of the

[1] Quoted by Landois and Stirling, 4th edition, p. 307.
[2] *Brit. Med. Journ.*, July 19, 1902.

larynx to some extent. It lies closely pressed against the posterior surface of the tongue, as this travels backwards, and with it cuts off the view of the forward movement of the arytenoid cartilages when about half of the distance to the cushion of the epiglottis has been travelled by them. The epiglottis is pushed backwards until it is seen lying between the posterior pharyngeal wall and the base of the tongue, in such a position that it is almost impossible for it to be drawn further down to act as a lid for the larynx (Fig. 13). During this backward movement of the epiglottis, its lateral margins are drawn backwards and downwards by the aryteno-epiglottidean muscles, thus making the posterior surface of the cartilage more concave from side to side. As the constrictors release the epiglottis comes into view again, occupying the same position as when last seen, and returns to its normal position as the tongue comes forward.

Throughout the entire movement—excepting for the incurvation of its margins—the epiglottis plays a passive part, and all its movements depend on the pressure exerted on it by the tongue. Its pliancy is increased by the raising of the thyroid cartilage during swallowing, and the consequent slackening of its attachments to the thyro-hyoid membrane, &c.

The other, and perhaps more important, function of the epiglottis is to receive the mucus and other secretions coming from the mouth, nose, and pharynx, upon its convex anterior and upper surface, and so deflect them laterally into the two sloping pyriform fossæ, by which they pass easily and readily into the œsophagus.

These conclusions as to the functions of the epiglottis are borne out by clinical experience. In the Transactions of the Medical Society (London) for last winter is the record of a patient whom I referred to Mr. Carless for epithelioma of the epiglottis. This surgeon removed the whole epiglottis, and a good portion of the base of the tongue on one side, by an external operation. The patient was free from any recurrence eighteen months later, with a good voice, and able with care to swallow comfortably. As might be expected from the above explanation, he was troubled with "phlegm in his throat" and a desire to hawk and clear it before speaking. He preferred to have his nourishment in a liquid form, or to wash down the

masticated morsel with a mouthful of water. The explanation of this is that fluids are almost exempt from the second (pharyngeal) stage of deglutition, and a mouthful of liquid is shot from the mouth into the œsophagus without being grasped by the constrictors. This, too, is the explanation of the fact that in the accidental, or suicidal, swallowing of corrosive acids, while the lips and mouth are charred by the acid, no evidence of its corrosive action may be visible in the pharynx, although the œsophagus is extensively injured by it. In the patient shown by Mr. Carless and myself, the only protection to the larynx was afforded by what were formerly the aryteno-epiglottidean folds, but which now, in the absence of the epiglottis, have secured fresh attachments to the root of the tongue and become aryteno-glottic folds.

In diseased conditions, the removal of the epiglottis may even facilitate swallowing. Mr. Lake removes the tuberculous epiglottis with the galvanic snare for the relief of dysphagia, and although it is only a palliative proceeding as regards the constitutional disease, it is well worth employing, as it frees the sufferer from much pain and promotes euthanasia [1]

[1] *Proceedings, Laryngological Society, London*, November, 1902.

# Public Health.

## I.

## A BRIEF HISTORY OF CREMATION IN ENGLAND.

By SIR HENRY THOMPSON, Bart., F.R.C.S.,
*Consulting Surgeon, University College Hospital.*

I MADE a trip to the Great Exhibition in Vienna held there in the year 1873. Among innumerable objects of interest I was particularly struck with a small apparatus for cremating the dead body in the open air by means of wood only, and with the fact that the so-called "ashes" were absolutely white, resembling coarsely broken loaf-sugar. These were exhibited by Professor Brunetti, of Padua. I had heard of the recent introduction of cremation in North Italy, and had long been convinced that as a sanitary measure it was far superior to burial in earth. On returning to London I obtained permission, not only there, but in Birmingham, from the possessors of powerful furnaces to test the process on animals, and found the results quite equal to those I had seen. Hence I wrote an article in the *Contemporary Review* of January, 1874, entitled, "Cremation: the Treatment of the Body after Death," which led to much controversy and excited great attention both here and abroad; for it was translated into several European languages. I was overwhelmed with correspondence from all quarters respecting it, not a few reproaching me with my endeavours to revive old "pagan" and "anti-Christian" customs. Some indeed, perhaps the majority, were more or less friendly to the proposal. Still, all agreed in regarding the procedure as not likely to be realised in our time. However, before January closed a number of persons who were impressed with the importance of the subject assembled at my house and formed a society, which was constituted by subscription to the following declaration:—

> "We disapprove the present custom of burying the dead, and desire to substitute some other mode which

shall rapidly resolve the body into its component elements, by a process which cannot offend the living, and shall render the remains absolutely innocuous. Until some better method is devised, we desire to adopt that usually known as 'cremation.'"

Membership was constituted by signature to the above declaration, and the payment of an annual subscription of one guinea. Later, we agreed to select from among the members a council to manage its affairs, of which I had the honour of being chosen president, and it was entitled, "The Cremation Society of England." This was the first *society* formed in Europe. Among the members of the Council were Shirley Brooks, Ernest Hart, the Rev. C. Voysey, and T. Spencer Wells (afterwards Sir T. Spencer Wells). In 1875 we added several distinguished members:—Mrs. Rose Crawshay, the Right Hon. Lord Bramwell, Sir Charles Cameron, M.P., Dr. Farquharson, Lord Playfair, and Mr. Martin Ridley Smith, with Mr. J. C. Swinburne-Hanham as hon. secretary. His Grace the Duke of Westminster joined on Lord Bramwell's death; also Sir Arthur Arnold and others. Having obtained legal advice, we decided to build a crematorium at Woking, on account of its being near to the great cemetery, "The Necropolis," there, and because we were enabled to avail ourselves of their arrangements for conveying the dead. We obtained an acre of freehold land in a secluded situation. and decided to request Professor Gorini to come over for the purpose of superintending its construction, during a period of three or four months, which he consented to do. Before leaving, Gorini tested it by burning a horse in an hour and a half, in such a manner that, by his arrangement of the furnace, no smoke or effluvia escaped from the chimney.

But in the year 1879 the Home Office gave us notice that our proceedings must be stopped, and that no cremation should take place without the consent of the Home Secretary, or steps would be taken to render cremation illegal. We therefore had now to rest patiently, satisfied with propagating our principles and publishing accounts of the practice of other countries and the advantages gained thereby. In February, 1884, however, a happy incident took place; a cremation was performed in Wales on the body of a child by its father in defiance of the

coroner's authority, and the case came before Mr. Justice Stephen at the Assizes. He declared that cremation was a legal procedure provided no nuisance were caused thereby to others. This was a great triumph for the cause, and we at once declared ourselves absolved from the promise to the Home Office, and publicly offered the use of the crematorium for those who desired to adopt the method, always making strict inquiry into the cause of death in the case of every applicant, to prevent the destruction of a body in which the cause of death had been due to poison or violence. The first body cremated at Woking was—on March 26th, 1885—that of a lady. Two more followed that year. Meantime it must be recorded that in 1884 Sir Charles Cameron had brought a Bill into the House of Commons to "provide for the regulation of cremation and other modes for disposing of the dead." It was seconded by Dr. Farquharson, M.P. for Aberdeen, another member of the Council, and supported by Sir Lyon Playfair, and although it was lost by a (not large) majority, the result was then regarded as successful under the circumstances.

At this time we had only a crematorium; we had no chapel, waiting-rooms, or other appliances. I was fortunately acquainted with the (ninth) Duke of Bedford, who strongly approved of cremation, and who furnished me with unlimited sums of money as I required them, till these were completed, to the extent of £3,000 or £4,000. He constructed also a special crematorium for himself, an annexe to the larger one, which belongs to the family. His much lamented death took place not long after, and he was cremated there.

To return to the operations at Woking, our progress continued steadily during the seven years after opening it, and in the years—

| | | | | | |
|---|---|---|---|---|---|
| 1892 | - | - | 104 | cremations | took place. |
| 1897 | - | - | 173 | „ | „ „ |
| 1899 | - | - | 240 | „ | „ „ |
| 1900 | - | - | 301 | „ | „ „ |

and in 1902 probably a higher figure will be reached. Other crematoria have been established and are actively employed; the first and chief at Manchester opened in 1892; Liverpool, Glasgow, Hull, and Darlington followed in the order named; and preparations are making for others elsewhere.

We come now to a very recent period. It appeared necessary to erect a far superior building accessible to and worthy of the City of London, known as the "Golder's Green Crematorium." Twelve and a half acres of land were secured within five miles of the Marble Arch, or within half-an-hour's drive of the West End, by a limited-liability company, with a capital of £25,000; formed for the purpose by a few members of our Council, with Mr. Martin Ridley Smith, the banker, for the Chairman. A noble building was nearly completed last month, and I was requested by the Chairman to declare it open before a considerable audience, in the beautiful and spacious chapel, on November 22, which I did, in an address giving a general outline of the history of cremation. A large columbarium is also in progress of erection, and the ground has been planted with a number of young trees, so that in course of time it will present a very picturesque appearance. Spaces, moreover, will be reserved for special monuments for those who desire to have them. It is well worth making a journey to see it, and there is every reason to believe that it will not only be one of the most effective in existence, but will also be a successful commercial enterprise.

## II.

## THE RELATIONSHIP BETWEEN VOLUNTARY AGENCIES AND SANITARY AUTHORITIES IN PUBLIC HEALTH WORK: TWO ILLUSTRATIONS.

By GEORGE NEWMAN, M.D.;
*Medical Officer of Health of the Metropolitan Borough of Finsbury.*

THE recent report of the Mansion House Council on the Dwellings of the Poor[1] brings into passing notice the action taken by this body and its relationship to general sanitary administration by local authorities. A brief consideration may, therefore, be given to this subject in the present issue.

We are liable to forget how extensive and far-reaching voluntary sanitary work has become. Yet even a cursory examination will reveal quite a number of non-professional public bodies having for their object the diffusion of the laws

[1] *The Dwellings of the Poor.* Report of the Mansion House Council for the eighteen months ending June 30, 1902.

and principles of public health, and the stimulation of municipal bodies in the discharge of their duty.[1] One of the most comprehensive statements of the various aims and objects of these associations reads as follows :—

"(*a*) To create an educated public opinion with regard to sanitary matters in general. (*b*) To direct the attention of the authorities and the public to any (if any) points in which the existing powers for maintenance of the sanitary condition of the city are either not duly exercised or are inadequate, or in which the machinery at the disposal of the sanitary authorities is or may at any time be insufficient. (*c*) To watch the course of sanitary legislation on behalf of the public, and to form a body in which the public may have confidence and through which they may, if necessary, act. (*d*) To provide its members, at a moderate cost, with such advice and supervision as shall ensure the proper sanitary condition of their own dwellings, and to enable them to procure practical advice as to the best means of remedying defects in houses of the poorer classes in which they are interested. (*e*) To promote sanitary science in any manner whatsoever, and especially by the collection of facts, statistics, and general information, and by diffusing the knowledge so acquired by lectures, meetings, and exhibitions, and by printing and publishing the same, and by giving prizes and rewards for proficiency in sanitary science, and by furnishing grants in aid of sanitary education (provided that the association shall not grant diplomas and titles)."

These avowed objects may be taken as a type. With their general tenor almost everybody would have sympathy, and a fulfilment of these theoretical aims would lead to a marked improvement in the life of the people. But these are not only theoretical ideals. There is evidence to show that a considerable amount of practical sanitary work is accomplished by these voluntary societies, and two illustrations may be selected to show the helpfulness and strength derivable from coöperation between such societies and the ordinary officers of the sanitary authorities.

[1] The National Health Society; The Mansion House Council; The Dublin Sanitary Association; The Edinburgh Health Society; The Liverpool Ladies' Sanitary Association; The Manchester and Salford Sanitary Association; The Manchester Ladies' Health Society; and The Smoke Abatement League may be named as examples.

The Mansion House Council was established in 1883. Among those who took an active interest in its work and objects were Cardinal Manning, Lord Shaftesbury, and Mr. Samuel Morley. There existed at that time a considerable degree of "supineness" and laxity of administration on the part of the metropolitan sanitary authorities, which becomes very evident to the reader of the "Report of the Royal Commission on the Housing of the Working Classes." The origin of the Mansion House Council was indeed in this remissness, which in its turn had its origin in admittedly evil conditions arising from inadequate inspection and administration of the authorities. It is now generally conceded that the failure of administration was due to the character of the vestries and other local authorities, the members of which were often, if not generally, unsuitable persons for the office. They obtained office by the vote of the ratepayer. The vicious circle was thus complete. Indifferent or ignorant ratepayers selected unsuitable representatives, who failed to execute their duty as a sanitary authority, appointing an inadequate inspectorial staff at inadequate remuneration. The latter naturally became "supine," and being unable to act, except against the interest of their employers, allowed sanitary matters to go from bad to worse. At last the unsatisfactory state of affairs gave rise to voluntary agencies, philanthropic or otherwise, who stimulated the ratepayer to select better rulers. This would appear to be an English way of doing things, and it has without doubt a good deal of common-sense to recommend it. But on the other hand it is belated, the damage is done, and the reformation is consequently slow.

The Mansion House Council began its work by means of "sanitary aid committees," composed of voluntary workers, and assisted in 1886 by two paid inspectors. These committees took their cue from a recommendation of the Royal Commission to the effect that the evil conditions existing had arisen more from failure in administration than in legislation, and that what was required was an enlightened public opinion and a careful study of the facts of the case. Local inquiries were also made, in Clerkenwell in 1885; in Mile End, 1886; in Bethnal Green, 1887; in Rotherhithe, 1888; and in Shoreditch in 1890. The influence of these public inquiries extended beyond the districts

immediately concerned, and had a salutary effect in stimulating local authorities in respect of sanitation. It must not, however, be supposed that the general awakening in regard to this matter was due only to the Mansion House Council. Every step of advance, from the days of Chadwick and Simon to the time of the Housing Commission's Report, was contributing to this end. The fruits of that Commission, as represented in the "Housing of the Working Classes Act, 1890," and the "Public Health (London) Act, 1891," were particularly effectual. It may be said that both were consolidation Acts, largely consisting of the adaptation of previous legislation. The latter of these two Acts gave the London County Council the necessary power of supervision over the other sanitary authorities in the metropolis, and, subject in certain cases to the approval of the Local Government Board, the power to intervene and do the work of any sanitary authority in default.

During the last ten years there have been considerable and varied improvements in London, and the Mansion House Council naturally asks itself how far the need exists for its work to continue and what shall be its future policy. The answer furnished is as follows: "The Council intends to continue its old plan of operations, as far as regards the work of local committees, and the inspection of individual cases of nuisances and sanitary defects, and to amplify another side of its work which has been allowed to fall somewhat into the background—the work of influencing public opinion and acting as a bureau of information on subjects connected with public health and housing."[1] The Council propose to carry out this policy in the following ways:—(*a*) By receiving, verifying, and forwarding to the proper quarter the complaints of poor tenants, and otherwise working in their interests; (*b*) the detection of failures in sanitary administration arising through the default of officials, the division of responsibility between different authorities, or otherwise; and (*c*) the education of public opinion. This policy seems in every way commendable, particularly in the third plank of its platform. There is not now, for various reasons, the same need for stimulating local authorities, although the Council devote more

[1] Report, 1903, p. 17.

than a dozen pages of their report to an account of a certain district, which may seem at first sight to contradict our proposition. We do not know that it was altogether wise or expedient to enter so fully into such a case. But, however that may be, the main policy of the Council should be, we submit, of an educational character.

The work which the Mansion House Council has done during the last 18 months includes 10,327 inspections by the paid inspectors; 5,657 houses were inspected by them, 1,728 cases were dismissed as remedied, 3,167 cases were dismissed as so trivial as to require no serious attention (which is another illustration of the futility of being guided by "complaints"), and 762 cases are reported as "still under consideration." Local sanitary aid committees exist and carry out more or less regular work in the following districts :—Bethnal Green, Hammersmith, Hampstead, Kensington, Lambeth, Paddington, Shoreditch, Stepney, St. Pancras, and Woolwich. Not forgetting that such working as this must involve some mistakes and must run the risk of incurring the displeasure of sanitary authorities from time to time, we cannot doubt that on the whole substantial work has been done, and work—especially the educational part of it—which will be required in the future certainly not less than in the past.

We cannot here discuss in equal detail the work of all the societies we have named. But as a second illustration something may be said of the recent work of the Manchester Ladies' Health Society,[1] which is typical of a somewhat different set of societies.

It is a branch of the Manchester and Salford Sanitary Association, and was established as early as 1862. It concerns itself partly with social and partly with sanitary matters, and has of late years grown in strength and influence. That portion of the work of the Society which brings it into relation with the Public Health Department of the Corporation, is carried out by "Health Visitors," who are employed, guided, and assisted by the ladies who form the Society. The Visitors live in their respective districts, and are at the constant call of the people for help and advice. They visit the houses systemati-

[1] Report on the Health of the City of Manchester, 1901. By James Niven, M.A., M.B., Medical Officer of Health. Pp. 284-287.

cally—six hours a day except on Saturdays—and a report of their work is received each morning by the Medical Officer of Health. Manchester and Salford are mapped out into districts, containing, say, from 1,000 to 3,000 houses; one or sometimes two ladies superintend each district, and the Visitors work under their direction. The Manchester Corporation pays the salaries of half the number of the Visitors, who are engaged amongst the poor in the city, at the rate of 16s. per week; and the Medical Officer of Health coöperates with the committee of the society in the management of it. The object of the society is stated in a sentence, namely, "to popularise sanitary knowledge among all classes." A number of rules and instructions regulating the work of the Visitors have been drawn up, including an admirable scheme for obtaining uniformity in the daily reports, and for adequately covering the necessary ground. The four chief divisions under which observations are to be made are (*a*) the general sanitary condition of the house visited; (*b*) the general mode of living, especially as regards cleanliness; (*c*) the feeding of the children; and (*d*) as to the existence of illness in the house and whether or not a medical man is in attendance.

Dr. Niven writes:—"The work performed by these societies for a number of years in teaching personal and household cleanliness in the poorer districts of the city has had a marked effect in these districts, and an improvement on former conditions can now generally be discerned." These "Health Visitors" made 32,435 inspections of houses in the course of systematic house-to-house visitation in their respective districts, and 1,610 special inquiries in cases of death; and they made 1,368 complaints as to insanitary conditions which they detected in the course of their daily work. During 1901 they distributed 36,399 leaflets, containing advice as to precautions against, or prevention of, diarrhœa, consumption, measles, and whooping-cough, and giving general suggestions to householders and hints on the feeding of infants. By this distribution of leaflets and personal instruction a system of educational work is constantly going on amongst the poor of Manchester. But even these large figures do not include all their labours. During the year they have been enabled to get 10,441 rooms, yards, closets, &c. thoroughly cleansed and limewashed. In the course of their

daily visits in 1901 they came across 306 cases of neglected children in which helpful action was taken; and similar voluntary assistance of a great variety of kinds was rendered to 3,383 families. Dr. Niven reports :—

"During the year they have been engaged in another very important work, viz., supervising the disinfection of houses in cases of consumption, and seeing to their subsequent cleansing, and with one or two exceptions this work is carried out to my entire satisfaction. At the end of the year they had 346 cases of consumption under observation in their respective districts. It is their duty to report monthly as to whether the house is clean and free from dust and dirt, and every three months they see that a thorough cleansing of the house takes place, so as to keep down infective material as much as possible, viz., the walls are rubbed down with dough, the floors and furniture washed, and the bed clothing and personal clothing of the patient washed in boiling water."[1]

The Visitors keep under observation all the consumptive cases which have been notified in their respective districts. It will be remembered that voluntary notification of phthisis is in operation in Manchester.

These two examples afford ample illustration of the "practical" work, as regards minor sanitation, which can be done by voluntary societies having no statutory powers. But there can be little doubt that the chief service which such organisation can render is not to emulate, even in a smaller sphere, the official work of sanitary authorities, but to *educate public opinion*. Every year shows the importance of this educational work. The National Association for the Prevention of Consumption is practically helpless without the public at its back, not alone for support, but for the practice of its principles. The satisfactory solution of the vaccination question rests also with an enlightened public opinion. Legislation may be ideal, but it is "the man in the street" who in a very real sense makes the legislation practicable. The increased rate of 3d.—if the whole cost (500,000*l.*) of the Metropolitan Asylums Board in connection with the small-pox epidemic in London is to be

[1] Report on the Health of the City of Manchester, 1901. By James Niven, M.A., M.B., Medical Officer of Health. P. 287.

defrayed at once[1]—falls upon the ordinary non-professional ratepayer. Many of the new powers under the Factory Act, 1901, depend for their proper fulfilment upon an enlightened public opinion. And so the list might be made almost endless. Even the official work of the sanitary authorities is only satisfactorily accomplished by coöperation between the professional sanitarian and the public. No good will ultimately be gained by setting one agency against another, or by one agency ignoring the other. The relationship between non-professional work and professional must always be a delicate one, and one that requires constant watching. But it is clear that the time has come fully to recognise the admirable work which the various voluntary agencies are performing in the direction of public health, and to emphasise the common aim existing between them and the sanitary authorities.

[1] Metropolitan Asylums Board Annual Report, 1901, Vol. I., p. 13.

# Reviews of Books.

*Text-book of Pharmacology and Therapeutics.* Edited by W. HALE WHITE, M.D., F.R.C.P., Physician to, and Lecturer on Medicine at Guy's Hospital, London. Edinburgh and London: Young J. Pentland. 1901. Pp. viii and 1040. Price 21s.

DR. HALE WHITE'S imposing volume is the product of the combined labours of himself and 28 other contributors, among whom are found many of the most noted pharmacologists of the day. As it is now the fashion to compile medical treatises on the composite system, we suppose it was inevitable that such a work dealing with the therapeutic aspect of medicine should appear sooner or later. The defects of this system are patent; in the present case they are so evident as almost to appear exaggerated. The most essential qualification for a text-book is unity of purpose; and, while we do not think it necessary that it should be forfeited in composite books, this is sure to be lacking unless the editor performs his functions with precision. If the matter of this book were put into a different form, and designated a dictionary, this objection would disappear; but we think we are not hypercritical in raising it, when—to take an instance that meets our eye on the open page – we find Kaladana resin separated by 200 pages from Jalap, for which it is an Indian substitute. The editor hopes that the index will atone for deficiencies of classification; but we cannot find that it furnishes the slightest clue to the relationship of these substances. A large number of omissions are accounted for by the statement in the preface that "the chemistry of the drugs is either entirely omitted, or only described in the case of the more important drugs, as far as has seemed necessary to help to explain their action or use." This, in a treatise on pharmacology, is supposed to excuse the omission of such principles as podophyllotoxin. On the other hand no reason is given for the inclusion of curiosities, such as amyl cupreine and quinethylene. In these instances we see the extremely great difference of treatment adopted by the various contributors. A good indication of this defect, because it

admits of numerical expression, is to be found in the bibliographical references. Taking two important drugs—Hydrargyrum and Cinchona—we find that in the first case the names of nineteen authors appear in the list, whereas in the second case there are over a hundred names to which are attached about 150 references. We have dwelt upon the faults of this work because they are such as are common to books of this type, and militate against their usefulness as text-books to such an extent as to call for a word of warning.

Before considering the merits of Dr. Hale White's volume, we should like to say that we think that chapter-headings such as these :—"Drugs which are Pharmacologically, Therapeutically, and Pharmaceutically unimportant" and "Drugs of Pharmacological but not of much Therapeutical Importance"—when considered in conjunction with one headed "Carbo Ligni," show that the sense of proportion is rather deficient in the editor as well as in the contributors.

There are many features which demand special mention, and of these, the first in place, and one of the first in importance to the pharmacologist, is Dr. Hopkins' article "On the Relation between Chemical Constitution and Physiological Action." Others are "Organotherapy" (Dr. Hector Mackenzie), "Serum Therapy" (Dr. J. W. Washbourn), "Diet" (Dr. Sidney Martin), "The Action of Gases" (Dr. J. S. Haldane), "Mineral Waters" (Dr. D. J. Leech), "Baths" (Dr. W. Hale White), "Chronic Heart Disease" (Dr. G. V. Poore), "Climate" (Dr. Michael G. Foster), "The Health Resorts of the United States" (Dr. S. E. Solly), and "The Uses of Electricity" (Dr. J. H. Bryant). The personal experiences and characteristics of the several writers are manifested in a manner which will be highly appreciated by those who find pharmacology interesting in any degree. Dr. Oliver's article on the astringent metals embodies in a succinct form the outcome of his laborious investigations. What Dr. Shoemaker refrains from saying about mercury or its compounds may very safely be considered to be of no account. Without entering into details, which would perhaps be tedious to our readers, we can say that, accepting the unavoidable limitations we have referred to, and those set by the editor, the numerous articles in this work are of a very high order of merit ; the standard reached being such, however, as the names

of the distinguished authors would lead us to expect. There are a few typographical and grammatical mistakes, which it would be almost impossible to avoid in the first impression of a book of this size. When a new edition is called for we would suggest that an attempt should be made to make the articles more uniform in arrangement, and that the pharmacology should not lag behind the chemistry, as it does in Ipecacuanha. This volume must find a lodgment on the shelves of every physician who makes any claim to be considered well-informed concerning the action of remedial agents of all kinds.

*Pharmacopedia.* A Commentary on the British Pharmacopœia, 1898, by EDMUND WHITE, B.Sc., F.I.C., and JOHN HUMPHREY. Pp. xiv and 696. 46 plates. London: Henry Kimpton. 1901. Price 14s.

ALTHOUGH this work is primarily intended for the pharmacist and the pharmaceutical student, it is such a comprehensive commentary upon the Pharmacopœia from the point of view of the chemist that it must be an essential aid to every physician who aspires to a scientific knowledge of the medicaments he prescribes. The drugs are treated in the same alphabetical order as in the Pharmacopœia. The authors have gleaned the fields of botany, chemistry, and pharmacy, and have given the results of their work in a manner which not only elucidates, but illumines the official volume. Henceforth no one can complain of a deficiency of knowledge concerning the composition of official remedies. The enormous amount of detail seems to us to remove the book altogether from the category of students' text-books, and places it among books of reference. Such a matter as the chemistry of Santonin covers the question of the changes which light induces in that article; and the authors give the composition of the substances into which it becomes converted, as well as the conditions which favour the change. These are matters with which it is not desirable to burden the memory of the student. On the other hand the chapters treating of the tinctures and of the oils, and the methods adopted for their examination, as well as the frequent notes explaining the constitution and manufacture of organic chemicals, should be in the hands of every medical and pharmaceutical student. It is a most

comprehensive compendium of all the most recent scientific research as applied to the Pharmacopœia. The authors are to be commended, not only because they have laboriously compiled a wealth of detail, but because they have succeeded in working it up into a book which is systematic and, at the same time, written in a style which is clear and pleasing. The publisher has done his part in producing a volume of a convenient size, well bound and printed in very legible type.

*International Clinics. A Quarterly of Illustrated Clinical Lectures and especially prepared Articles.* Twelfth Series. Vols. I. and II. 1902. London: J. B. Lippincott and Co. Price 10s. 6d. nett each volume.

THE two volumes before us contain a variety of articles ranging over a great part of the field of medicine, surgery, and gynæcology. To review them separately is impossible in the space here available. We notice, among others in Vol. I., a sensible paper on "Habitual Constipation," by Boas, of Berlin, in which the author mentions that contrary, to the usual opinion, much exercise—as in postmen, messengers, &c.—may actually lead to constipation, while rest and forced feeding may relieve it. Simon, of Baltimore, deals with "Basophilic Granules in Red Corpuscles," the paper being illustrated with a coloured plate; and there are articles on "Tetanus," "Removal of the Superior Maxilla," "Symphysiotomy v. Cæsarean Section," and "Gastro-intestinal Auto-intoxication." In Vol. II. are papers on "Urethritis," and on "Bladder Troubles in Nervous Diseases"; also on "Resection of the Cervical Sympathetic," "Classification of Cirrhosis of the Liver," "Beta-Oxybutyric Acid in the Urine of Diabetes," and "Vesical Calculus." Among the contributors we notice the names of Mr. Charles Gibbs, who contributes a paper on "Bullet Wounds of the Central Nervous System," and of Mr. Daniel on "Pancreatic Cysts." The majority of contributors are naturally American, but many of the well-known physicians and surgeons of the Continent of Europe are represented—Boissard, Hallopeau, Finger, Jonnesco, Lépine, Lucas-Championnière, and Robin. The volumes are well got up and lavishly illustrated.

*Transactions of the Clinical Society of London.* Vol. XXXV. London: Longmans, Green and Co. 1902.

THE papers contained in this volume of Transactions maintain the usual standard of interest. We may mention from among them Mr. Moynihan's paper on "The Operative Treatment of Cancer of the Stomach," Mr. Carwardine's article on "The Origin of Cysts in the Neck," and the contribution by Sir Thomas Barlow and Dr. Batty Shaw on "The Inheritance of Recurrent Attacks of Jaundice." Among the illustrations, that of a hair-ball from the stomach, by Mr. Percy Paton, and those of Fragilitas Ossium in the paper of Mr. Warrington Howard call for mention. There are also a large number of well-executed skiagrams.

*Medical Ethics: A Guide to Professional Conduct.* By ROBERT SAUNDBY, M.D. Edin., Professor of Medicine in the University of Birmingham, &c. Pp. 88. Bristol: John Wright and Co. 1902. Price 3s. 6d. nett.

THE maxim that, if a professional man behaves as a gentleman, no other rule of conduct is necessary, is apt to fail in individual instances; and the many questions asked and answered in the correspondence-columns of the medical newspapers show that guidance is often sought as to the various relations of practice. This little book by Dr. Saundby, based upon rulings of the College of Physicians and upon answers in the journals, supplies a series of rules of conduct applicable to various circumstances, and will afford a useful standard of reference on ethical matters. We may mention as examples of the subjects dealt with:—The relations of Medical Officers of Health to their medical neighbours, the advice to be given in the various circumstances under which patients may raise the question of the advisability of their marriage, the status and duties of Locum Tenentes, the use of secret remedies, the propriety of consultation with homœopaths, and professional secrecy. Incidentally, we may venture to ask whether there is authority for the spelling "secresy" adopted in this book. The study of Medical Ethics has not apparently made such advances in this country as on the Continent of Europe. As far as we know, this is the first attempt which has been made to codify the scattered decisions on points of conduct, and we welcome it as such. We can

heartily commend it to the attention of all practitioners of medicine. If the propositions laid down have not the force of law, and may even fail to command in all cases universal acceptance, still the study of the points dealt with is of itself a useful exercise. The type is pleasant to read, though the printing leaves something to be desired, and in the absence of any need for illustrations the polished surface of the paper employed is a drawback rather than an advantage from the reader's point of view.

*Anæsthetics: A Practical Handbook.* By J. BLUMFELD, M.D. Cantab., Assistant Anæsthetist to St. George's Hospital; Anæsthetist to the Grosvenor Hospital for Women and Children. Medical Monograph Series, No. 7. Pp. 109. Cr. 8vo. London: Baillière, Tindall, and Cox. 1902. Price 2s. 6d. nett.

THIS handy little volume sets forth clearly and concisely the main facts relating to anæsthetics which it is necessary for the student to master. It deals with the nature and action of the common anæsthetics, with the principles that guide the administrator in selecting an anæsthetic, and with the methods of administering each. The various dangers attending their use are clearly recounted and the means of meeting them indicated. The book has also a fairly adequate index. It might perhaps be suggested that when one looks in haste to find guidance in a case of "heart-disease," the index helps little by giving merely the word "Heart" and ten separate references to it. The paper and print of the little volume are excellent, and we can cordially recommend it for the purposes for which it was written.

*Vari Metodi Anestesici e loro Indicazioni* (Various Methods of Anæsthesia and the Indications for them). By Doctor GIOVANNI PALLERONI, Assistant in the Surgical Clinic of the Royal University of Palermo. Pp. 276. 1902. Naples.

THIS manual deals with the different substances used to produce anæsthesia and the indications for the use of them. Not only general, but also local anæsthesia is discussed, and the recently invented method of spinal cocainisation receives due notice.

In Italy apparently chloroform is the drug most commonly used to produce general anæsthesia, ether being only occasionally employed, in spite of the fact that comparative statistics show a greater mortality under the former. Profounder anæsthesia and more complete muscular rigidity are the advantages claimed for chloroform. With regard to hypnotism as a mode of producing insensibility to pain, the author concludes that "this process, especially the method of Luys, cannot be of advantage to the patient physically or morally: I do not believe that, in general, a sufficiently profound anæsthesia can be obtained by this method for surgical purposes."

*Histology and Pathology.* By J. B. NICHOLS, M.D., Demonstrator of Histology, Columbian University, Washington; and F. P. VALE, M.D., Assistant in Pathology, University of Georgetown, Washington. London: Henry Kimpton. 1901. Pp. 458. Price 7s. 6d. nett.

IT is a somewhat original idea to include both histology and pathology in one volume. The book is not a long one, and the descriptions are necessarily brief, but as far as they go seem to be correctly and carefully drawn up. To such important subjects as inflammation, fever, and the germ-theory, however, but scanty justice is done; and in our opinion it would have been better to limit the scope of the work to pathological histology. The book is well illustrated.

*A Manual of Determinative Bacteriology.* By F. D. CHESTER, Bacteriologist of the Delaware College Agricultural Experimental Station, &c. London: Macmillan and Co. 1901. Pp. 401. Price 10s. 6d. nett.

THIS work commences with an introductory portion upon methods, upon nomenclature, and upon the classification of the bacteria. The remainder, and by far the larger portion, is devoted to a series of descriptions and tables of the characters of the various species of bacteria necessary for their identification. The book is essentially a laboratory guide for the determination of species, and as such supplies a long-felt want and will be most useful. There are a few errors, which detract from its value, and which should be corrected in a future edition.

# Notes by the Way.

**Ave atque Vale.**

OUR readers will have been prepared by the note which appeared in the December number of THE PRACTITIONER to see that Mr. Malcolm Morris's name no longer adorns the cover of the present issue, but all will yet be conscious of keen regret at the severance of a connection which has now lasted for eight years. Mr. Morris's success as Editor has been too conspicuous to need any reference here, and we can only congratulate ourselves that his interest in THE PRACTITIONER will not cease with the withdrawal of his name from the cover, but that he will be available as friend and counsellor to guide the inexperienced steps of his successor in the path in which he should go. Fortunately, then, we are not come in any sense "to bury Cæsar," and "to praise him" would be superfluous.

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**Our Change of Shape.**

WE hope that the alteration in the get-up and appearance of THE PRACTITIONER inaugurated in the present number will meet with the approval of our readers. The alteration is in form rather than in substance. We shall endeavour in future to make the original articles the leading feature of the number, but shall continue to publish those reviews of different branches of medical science which have been so much appreciated in the past. The difference of type formerly made between the several parts of each number is no longer preserved. The editorial notes, which formerly appeared under the heading of *The Month*, have now been relegated to a subordinate position, no longer occupying the first pages. It would be difficult or impossible for any successor to Mr. Malcolm Morris to maintain the peculiar features of these notes—that genial criticism of men and matters, which has been so conspicuous in bygone years. The present Editor must needs be content with humbler comments, dealing rather with the scientific and literary side of medicine than with politics and persons.

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**Animal Remedies in Korea.**

SOME curious notes appeared recently in the *Indian Lancet*, giving an account of some of the uses made in Korea of various insects and out-of-the-way animals. The officinal properties in most cases could hardly be guessed from the nature and appearance of the creature, so that it is not clear how the virtues resident in each were discovered or imagined. Thus "the nature of the devil-fish (octopus) is tranquillising;" the sight of the beast is much the reverse. Pounded pediculi are good for ulcers, and especially for wounds of the scalp. Wood-lice were in days gone-by a recognised remedy in our own country, perhaps owing to their habit of rolling themselves into a ball resembling a pill. In Korea they are used for disorders of menstruation, asthenia, and difficult micturition. They should be collected on the fifth day of the fifth month and carefully dried. Snails, on the contrary, should be caught in the eighth month, and are useful for lameness, rectal prolapse (presumably as an ointment), convulsions, and thirst. A special sort may be used to sober drunken persons. The insect politely referred to as "Cimex lectularius" apparently flourishes in Korea, as they are nick-named, on account of their large size, "Asiatic strawberries." They are a useful corrective of profane and ill-tempered persons. Mosquitoes—curious to relate—are preventives of malaria and also of fits of anger, both of which affections they are now held to be more efficient in producing than in relieving.

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**Tape-worms and Diabetes.**

A RECENT writer in *The Lancet* has suggested that tape-worms may have some influence in producing diabetes, as he has noticed that in two cases in which the parasites were present there was sugar in the urine. That they may have this effect it is impossible to deny, since it is not often that an examination of the urine is made in sufferers from tape-worm; but the mode of action suggested—viz., obstruction of the pancreatic duct—seems hardly probable. It is well known that experimental obliteration of the duct with paraffin or some similar substance fails to produce in dogs and other animals symptoms of diabetes; and it is not safe to suppose that this result would occur in man.

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**The Pancreas and Diabetes.**

THE relation of the pancreas to diabetes presents a very difficult problem. Experimental extirpation of the gland produces a condition apparently identical with diabetes, but instances are related in which the gland has been totally destroyed by injection of the ducts with paraffin, and yet no permanent glycosuria has resulted. It is difficult to reconcile these results if they have been accurately observed. Even the mode of action of the pancreas in preventing glycosuria remains hypothetical. The supposed "internal secretion" cannot be demonstrated, like that of the thyroid gland, since treatment with dried pancreas is ineffectual as a means of cure. Still, the theory of an internal secretion remains the most promising explanation of many cases. Recently the secretion of the "glycolytic ferment" has been attributed to the groups of special cells scattered throughout the organ and known as the "Islands of Langerhans." It is said that, in some cases of atrophy of the pancreas associated with diabetes, these bodies are found to have undergone a peculiar hyaline degeneration (Opie). This condition, however, is not found in all cases of the disease, and if the theory be true in some instances, it is necessary to consider that there may be more than one form of diabetes.

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**Modern Cave-Dwellers.**

THE advantages of a plentiful supply of fresh air are beginning to be recognised in other directions beside the treatment of tuberculosis, and much advantage should result when they are realised by all classes of the community. At present we fear that there are still a very large number of persons in all social strata who have yet to learn to keep their windows open. Thus a New York physician (Freudenthal) writes of his own countrymen as follows:—

"If we compare our mode of living with that of a hundred or two hundred years ago, we must confess that we have returned to a very ancient style of living; we have become *mutatis mutandis* actually cave-dwellers again. In a ten by fifteen room the average human being passes twenty-three of the twenty-four hours of the day, or even more. The room is nothing but a cave-dwelling, with the exception that it is tightly

closed from all sides during the greater part of the year. It makes little difference whether we call this cave a sitting-room in a fashionable house, or whether we term it a sweat-shop. The difference is only in degree. The room is, as a rule, tightly closed against the invasion of fresh air. If we speak of climatic influence, and there certainly is such an influence, it is the climate of our rooms—of the caves which we inhabit—which we must study. It is immaterial what is the temperature, the degree of moisture, or the winds at Sandy Hook. The three million of inhabitants of our city do not live there, and it does not matter to them whether in the harbour of New York there is a great deal of moisture or not. When physicians say there is so much catarrh in our region on account of the great humidity of our climate, we must regard such statements as pure nonsense. Too much moisture will never set up a catarrh, and especially not that form of catarrh which you see mostly, and which is called the dry catarrh."

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**Universities and Languages.**

THE University of Oxford has declined to eliminate Greek from its entrance examination; the University of London has decided that not even Latin shall be required. The two seats of learning thus appear in sharp contrast; yet it is possible that both are right. The older University attracts those who can afford education away from home, and who can devote three or four years to the process of finishing and polishing their intellectual armament. The University of London is of use mainly to those who continue to reside at home during this part of their education, and who demand rather practical knowledge than enlargement of their mental scope. They come to their University course at an earlier age in many instances, and to them it represents merely a kind of higher school, which inspires no sentiment of membership and offers no opportunities of social intercourse. The chief end and object in view is the obtaining of a label, M.A. or M.D.; and when that has been obtained, the separation from the University causes no regret, such as is experienced by those who feel that their time at one of the old Universities has too soon come to an end.

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**College Life.**

IT is indeed scarcely possible that the University of London can ever imitate the peculiar advantages of Oxford or Cambridge. In a vast town such as London, college life must be practically impossible; or if it be not impossible in individual instances—for some such condition prevails at certain of our hospitals, where there are residential colleges—yet the grouping of colleges, each with its own *esprit de corps* and individual peculiarities, yet all closely knit together in social intercourse, cannot be reproduced. *Autre temps, autres mœurs.* Many, perhaps, will claim for the younger University the advantage of more practical instinct, and will sniff at the college life of the older institutions as out of date. Yet it was this very life which appealed so strongly to Cecil Rhodes; and if one so versed in affairs both of State and of commerce found it admirable, it is difficult to deny that, even in this age of bustle, time spent in college quadrangles is time well spent.

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**Licence to Practise.**

ACCORDING to a paragraph which appeared not long ago in the *Medical Record* (New York), a law has been passed in Germany by which it is enacted that no licence to practise medicine will be given to anyone who has not passed at least one year in practical work as assistant to some physician approved by the Imperial Chancellor, or in a Hospital or University klinic, devoting no less than four months to internal medicine. This is in addition to the usual qualifying examination (Staatsexamen). The enactment seems a useful one, tending to insure that every practitioner of medicine possesses a working knowledge of his profession before he is free to try his hand on his countrymen on his own account. It may well be asked whether something of the same sort is not needed in this country, now that the old system of apprenticeship is no longer in vogue. The advantage of having held a resident appointment at a hospital is well known, but there are many men who, on first qualification, prefer the immediate pecuniary attraction presented by "doing locums," and throw away the priceless opportunity of gaining experience as House-Physician or House-Surgeon. There can be no doubt that practical

knowledge is thus often replaced by mere book-learning, to the great subsequent loss of the young practitioner. The difficulty experienced in getting Resident Officers at many of our hospitals is merely a sign of the same thing. It would perhaps be scarcely possible to insist on the holding of a resident post as a preliminary to practice, since the number of such posts is limited; but some such an alternative as the German method might be found feasible.

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**Stammering.** THE article which appears on another page by Dr. Langwill draws attention to a minor ailment which is yet capable of causing a great deal of distress to those who suffer from it, viz. stammering. It is not often referred to in the text-books of medicine, and is, therefore, not much thought about by the student in the hurry of medical education; nor does the practitioner pay much attention to it. For this reason the cure of stammering is a question on which advice is rather sought from quacks and pretended stammer-curers than from doctors. It is a pity that this should be the case, as there is no reason why this particular functional ailment should be taken out of the category of nervous diseases, and looked on as an educational defect. No doubt it is impossible for the medical man himself to supervise the treatment throughout; yet this is equally true of gymnastics, the regulation of which is fortunately a part of orthopædic surgery.

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**Voice and Letters.** THE advice given by Dr. Langwill as to the treatment of stammering depends on the principle set forth by Professor Wyllie, that in some letters the larynx takes a definite part, the quality of "voice" being necessary to the proper pronunciation of them; while in others this vocal element is wanting, the letter being formed by a mere "shaping" of the sound as it is in the act of issuing from the mouth. If the pupil pays attention to this vocalisation of the letters, he will cease to stumble over these vocal consonants, just as, in singing, the worst stammerer never comes to a standstill.

# Novelties and Notices.

## ELIXIR GLYCEROPHOSPHATES (CALCIUM AND SODIUM).

The glycerophosphates are drugs the value of which has recently been extolled, especially for cases in which there is nervous exhaustion. The elixir before us, prepared by Messrs. Parke, Davis, and Co., is of agreeable taste and appearance. It is said to contain 8 grains of Sodium glycerophosphate and 4 grains of the Calcium salt in each fluid ounce, the dose being from a teaspoonful up to a fluid ounce.

## CASCARA EVACUANT.

Cascara evacuant is another product of the same firm. The nauseous taste of Cascara sagrada is always a great objection to its use, and many are the means which have been employed to overcome it. In this fluid preparation the active principles of the plant are said to be present apart from the bitter element. As mixtures containing cascara go, the taste is certainly not objectionable; but we can hardly say that bitterness is entirely absent. Cascara evacuant certainly appears worthy of a trial in those cases in which the drug is indicated.

## ADRENALIN CHLORIDE.

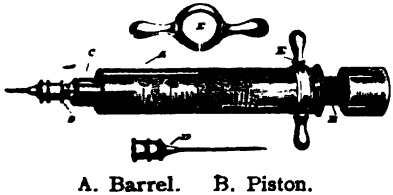
Messrs. Parke, Davis, and Co. also send us a sample of a preparation of Adrenalin Chloride, in the form of a 1 : 1,000 solution. The solvent is normal saline fluid, along with a small quantity of chloretone. The active principle of supra-renal gland is now used in a variety of conditions as a hæmostatic, and it is very desirable to have a reliable preparation of it for use. This solution of Adrenalin Chloride will meet a distinct need, if the difficulty of keeping delicate organic products has been satisfactorily solved. It should be useful in cases of capillary oozing after operations, and is worthy of trial in hæmophilic and similar patients.

### FRIEDRICHSHALL WATER.

The value of the various natural springs, containing salts in solution, in the treatment of chronic constipation has long been recognised. Among the various waters now obtainable Friedrichshall holds a high position in virtue of its medicinal qualities. It is hardly to be expected that an aperient water should be actually agreeable to the taste, containing as it does such salts as sulphate and chloride of magnesia, sulphate of soda and common salt; but among those waters which are really effective, Friedrichshall is as pleasant as any which have come under our notice. It is claimed for it that it may be taken in gradually diminishing doses without losing its efficiency, and that no ill effects will persist after it has been left off. In view of the peculiar nature of the salts which it contains, Friedrichshall Water should prove itself useful in many digestive and hepatic disorders.

### ALL-GLASS ASEPTIC HYPODERMIC SYRINGE.

We noticed briefly in a previous number the ingenious form of Hypodermic Syringe brought out by Messrs. Burroughs, Wellcome, and Co., in which the whole instrument is made of glass throughout. Its appearance is shown in the accompanying cut. The barrel of the syringe is ground internally, and the piston, similarly ground, fits accurately in it—so accurately indeed that on pressing the finger against the end of the cylinder and then forcing in the piston, the latter is driven out again by the air compressed within the tube. In a syringe of such simple construction cleanliness is easily maintained, and complete asepsis can be secured by boiling the whole instrument. This feature should commend the invention to those needing a syringe for bacteriological work. In ordinary practice, fortunately, it is seldom that any degree of sepsis is produced by a hypodermic injection; but even here it is well to be on the safe side. We cordially commend the idea which has given origin to the instrument before us.



A. Barrel. B. Piston.
C. Detachable nozzle. D. Needle.
E. Metal finger-grip.

The syringe is made in two sizes, holding respectively 10 and 15 minims. A metal finger-grip can be supplied, if desired.

### PURALIS WATER.

The number of diseases carried by water is legion, and the importance of securing a pure drinking-supply cannot be over-estimated. It is generally looked upon as a safe proceeding, when in doubt as to the quality of the water-supply in any locality, to have recourse to mineral waters of any kind that may be handy. At times this may prove a false security, as there is no guarantee that these table-waters are themselves made from a pure source. "Puralis Water," supplied by the "Pure Water Company," consists of water from a reliable well, distilled and aërated. It may therefore be relied upon as to purity. It forms an agreeable substitute for the usual Soda or Seltzer Water at table. It can be obtained in syphons or bottles, as preferred.

### MILK OF MAGNESIA.

The value of "Fluid Magnesia" is well known. The specimen of "Milk of Magnesia" sent us by The Chas. H. Phillips Chemical Company claims to contain Hydrated Oxide of Magnesium, and is in the form of a tasteless and odourless milky fluid, without any deposit. It should be a useful nursery laxative, as well as a corrective for gastric acidity and similar affections.

### PURE CONCENTRATED COCÒA.

The palatable and sustaining qualities of Fry's Cocoa have become a household word, and there is little need to commend it to attention. The sample sent to us shows that it has lost none of its attractions, and that the firm well maintain their reputation as manufacturers of a good article. Cocoa differs from tea and coffee in not only forming a pleasant and stimulating drink, but also affording actual nourishing material. It therefore has a double value as an article of diet. It has also the additional advantage that it is not liable to cause any gastric derangement, when carefully manufactured. This care in preparation is conspicuous in the product of Messrs. Fry's factory.

### MALTED COCOA.

Messrs. Fry also send us a preparation of Cocoa combined with Extract of Malt (Allen and Hanbury). It may be claimed for the combination that a cup of cocoa made from it contains the valuable qualities of a glass of beer added to those of a cup of cocoa. The value of malt-extract as an aid to digestion is well known, while it affords also in itself a source of nutriment; hence the combination before us should constitute a useful article of diet. We can vouch, from personal experience, that the flavour of the cocoa is not impaired by the admixture of the malt.

## NOTICE.

### *Association of Midland Railway Surgeons.*

We are requested to state that, at a meeting of Midland Railway Surgeons held in Birmingham on November 27th, 1902, it was decided to form an "association" on the lines of the long-established Great Western Railway Provident Society Medical Staff. Midland Railway surgeons who wish to join this association should send in their names and addresses to the honorary secretary, Dr. Ffennell MacCarthy (58, The Tything, Worcester).

## Practical Notes.

THE TREATMENT OF ACUTE EARACHE IN YOUNG CHILDREN.—Dr. George L. Richards advocates a medicated gelatoglycerin bougie composed of the following ingredients: Carbolic acid, 7 m.; fluid-extract of opium, 6 m.; cocaine, 3 gr.; atropine sulphate, 3 gr.; water, 52 m.; gelatine, 18 gr.; dehydrated glycerine, 158 gr., a sufficient quantity to make 42 bougies. This gives to each bougie carbolic acid one-sixth, and fluid extract of opium one-seventh of a minim, cocaine one-fourteenth of a grain, atropine sulphate one-fourteenth grain. These small bougies are particularly useful because they may be kept wrapped in tinfoil and may be inserted by the mother. (*Archives of Pediatrics.*)

In an article in *The Australasian Medical Gazette* (July 21, 1902) Hawkes comes to the following conclusions with regard to the TREATMENT OF HYDROCELE :—

"Balancing up for and against the various methods we get the following results :—Iodine injection gives 15 to 30 per cent. of failures, often a long absence from work (three to four weeks, at the least), and sometimes severe complications.

"Carbolic acid is rather better, with 10 to 12 per cent. of failures and a fair percentage of serious complications.

"Incision simply is uncertain and tedious, with 12 to 15 per cent. of failures.

"If part of the sac is removed as well, it reduces the failures to 5 per cent., the patients being able to get about in three weeks on an average.

"Complete removal of the sac means at least three weeks' rest, with severe complications in at least 10 per cent., but with very few failures as regards ultimate cure.

"Eversion of the sac means rest for a week or ten days, very few complications, and very few failures. On the whole it may be looked upon as the best and most reliable operation up to the present."

The operation of Eversion of the sac, "brought into prominence by the French surgeon Longuet, consists in turning the serous sac inside out, and so destroying the secreting membrane. The operation is a simple and quick one. An incision is made over the middle of the sac, enlarging it so as to expose it completely, and the unopened sac is isolated from its bed. It is then opened and turned inside out, being secured in its new position by a couple of fine silk or catgut sutures passed through the inverted sac close to the epididymis, so as to keep the sac inside out. It is then replaced in the scrotum, and the skin-wound closed with a few sutures. There is practically no reaction. A slight swelling is sometimes noticed for the first two or three days. Healing takes place, as a rule, within a week, and the patient is able to get about in this time."

For the PRURITUS ACCOMPANYING JAUNDICE, Gilbert and Hercher (*Le Bulletin Médical*, July 30, 1902) advise the use of THYROID EXRACT. "Under the influence of this medication, the reaction of Hay is modified, and as it is admitted that the pruritus is due to the action of the bile-salts on the terminations of the nerves, these authorities have come to the conclusion that thyroid extract exercises over the bile-salts a destructive or modifying influence. Solutions of the bile-salts mixed with thyroid extract, and injected into the vein of a rabbit's ear, are much less toxic in their effects than are the pure solutions of the salts. Thus it is shown that thyroid extract is a prophylactic against poisoning by biliary salts." (*Medical Record.*)

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ASPIRIN IN DISEASES OF CHILDREN.—Landan and Schudwak (*Die Heilkunde*, October 1901) give a report on the use of aspirin in rheumatism and the rheumatic affections of children. Its action is slower than that of sodium salicylate, but its effect is more prolonged. It does not cause tinnitus, and it does not produce a leucocytosis. The effect of the drug in lessening the exudation of pleurisy seems to be especially salutary, and as an antipyretic in typhoid fever it is

most satisfactory. It is claimed that it has a decided anti-convulsive action. From the report given it would appear that aspirin is a serviceable remedy which is especially indicated in rheumatism and allied affections as being superior to other salicylic-acid preparations. (*Archives of Pediatrics.*)

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LUPUS ERYTHEMATODES.—Eugen Hollander (*Berliner klinische Wochenschrift*, July 28, 1902) "takes sides with those who hold that lupus erythematodes is in no way tubercular in nature. There are many facts which may be advanced in support of this opinion, but that which carries the most weight is the result obtained by a cauterization of the lesions of this disease. Experience has shown that this form of lupus cannot be cured by cauterization, no matter how thoroughly and carefully this may be done. Surely, if the lesions were caused by the bacillus tuberculosis, means which destroy this micro-organism should be effective in the treatment of the disease. Hollander reports the successful treatment of a large number of cases by the internal administration of quinine combined with the local application of the tincture of iodine. The quinine is given in doses of ·5 gramme, three times a day, and within five to ten minutes after each dose the iodine is applied. This treatment is continued on each of five or six successive days, and then intermitted for a like period. The number of treatments necessary varies with individual cases, but, as a rule, does not exceed three or four of the periods above described. The exact manner in which the cure is brought about by this treatment is not entirely clear, but since it seems certain that the disease, primarily, is an affection of the cutaneous glands, it is reasonable to suppose that the drugs mentioned exert an influence upon the vessels of these glands, and thereby favour a restitution of their normal functions." (*Medical Record.*)

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F. S. Hough, in the *Iowa Medical Journal*, gives the following advice as to HOW TO TAKE CASTOR OIL.—The disgust for castor oil is due to the odour, not to the taste. If the patient grips the nostrils firmly before pouring out the dose, drinks it complacently, and then thoroughly cleanses the mouth,

lips, larynx, &c., with water, removing the least vestige of the oil before removing the fingers, he will not get the least taste from the oil, which is bland and tasteless. It all depends upon keeping any air from entering the nose during the time while there is any oil present. (*Medical Record.*)

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OPERATIVE TREATMENT OF PRURITUS VULVÆ.—Tavel advises that in obstinate cases of this affection and of vaginismus the internal pudic nerve, which brings both the sensory and motor supply to the parts, should be resected. He uses a four-inch incision on either side of the perineum, directed from before backward, in the middle of the perineal fossa, between the tuber ischii and the anal margin. The pulsation of the artery accompanying the nerve is useful as a guide to its position. The nerve is separated from the vessel and dissected up. The main branches going to the muscles of the vulva and to the area affected by the pruritus are cut through, close to their points of origin, and the peripheral portions are torn or twisted out. It is necessary to use some care in this operation in order to avoid wounding the inferior hæmorrhoidal nerve and the branches of the deep perineal nerve. (*Revue de Chirurgie.*)

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Writing to *The Medical Record*, Dr. D. E. English calls attention to his method of treating TYPHOID FEVER, as follows :—

"The main points in my plan of treatment are, the use of carbolated camphor as an intestinal antiseptic, a blood antiseptic, and a stimulant to the abdominal nervous system; an initial dose of from ten to thirty grains of calomel, and occasional doses of five or more grains throughout the course; a tablet of aloin $\frac{1}{8}$ gr. and podophyllin $\frac{1}{8}$ gr. every day or second day (except when the calomel is given), to increase the secretion of bile, and to keep the gut empty; strong feeding, by giving such food as will be absorbed from the stomach without passing on to the intestine, and by giving it in small doses, frequently repeated; large draughts of sterile water; and absolute rest. The carbolated camphor is simply gum camphor three parts and crystals of carbolic acid one part, allowed to liquefy. There

should always be visible camphor present in this liquid, in order that the carbolic acid be kept super-saturated. It should be given in ten-minim doses, in a capsule, every two hours, until the kidneys or heart show signs of irritation, when the interval between doses may be increased. For food I depend almost entirely on dissolved beef, made after Weir Mitchell's formula; and egg albumen stirred into cold water, and acidulated either with lemon juice or hydrochloric acid. Sometimes I use liquid peptonoids as a change."

The dose of calomel advised (30 grs.) appears rather heroic, but the carbolated camphor may be worth a trial. To push the dose, however, until the kidneys or heart show signs of irritation seems hardly wise.

If any drugs are of use in TYPHOID FEVER—and it seems hardly proved as yet that any besides stimulants are of much value—TURPENTINE seems to fulfil certain definite indications. Thus it is a styptic and astringent, which may tend to prevent diarrhœa and hæmorrhage; it is to some extent antiseptic and may aid in arresting the growth of bacteria in the intestine; and it is a preventive of flatulence, and so may be of service in diminishing the distension of the abdomen, which is sometimes a marked and troublesome feature. Turpentine may be given in gelatine capsules—10 minims every three or four hours—and it is usually well borne.

For the special form of DIARRHŒA WITH GREEN STOOLS to which infants are liable, the following formula may be employed :—

| ℞ | | |
|---|---|---|
| | Lactic acid | 1–2 parts. |
| | Syrup of orange flowers | 30 „ |
| | Distilled water | 70 „ |

A teaspoonful of this mixture may be given every two hours or more frequently, up to every quarter of an hour, according to the severity of the case. (*Revue Crit. de Méd. et de Chir.*)

# THE PRACTITIONER.

**FEBRUARY, 1903.**


## ADDRESS ON TUBERCULOSIS AT GLASGOW.

(DELIVERED ON NOVEMBER 6TH, 1902.)


BY T. CLIFFORD ALLBUTT, M.A., M.D., LL.D., D.Sc., F.R.C.P., HON. F.R.C.P.I., F.R.S.,

*Regius Professor of Physic in the University of Cambridge; Physician to the Addenbrooke Hospital, &c.*


THE pestilent fungus, which we are met together to execrate and, if possible, to excommunicate, is receiving now such profuse attentions that one is half disposed to some relenting, like that of Burns towards "Auld Nickie ben," in whom he would yet find some redeeming quality. Whitewashing the enemies of mankind is no unfashionable pursuit of the day; and although the fashion may never go so far as to make Tuberculosis look fair to us, yet we may learn that even the worst elements may have a reaction for good.

So my paradox may not startle you, if I begin with a word of apology for this particularly mischievous creature; but what can my demurrer be? Well, in tuberculosis I recognise the flogging schoolmaster—the Keate of pathology. Eton boys of the robuster sort, who dwelt in that school in the first half of the last century, and trembled under the scowl of its notorious headmaster, are known to have regarded Keate, if not as their friend, yet in some degree as a benefactor. He sought to eliminate the unfit among what the French call the "strugforlifers" of that house of liberal learning; and if tubercle is somewhat undiscriminating as a scourge, if its stripes are not always distributed as we would have distributed them, well, Keate bestowed his reformatory labours with scarcely more discernment.

The lessons which tuberculosis scourges into us are general and special. One of its general benefits is its chastisement of the tyranny of Common Sense, of the oppression of the Obvious. The man of Common Sense, the worshipper of the Obvious, is hardly silenced yet; he has been wont to say that he is able

to take broad views of things; that he is superior to fads and pedantries of all sorts; that he has thriven, he and his ancestors, independent of drainage, if not of soap and water, and upon what we upstarts are pleased to call dirty water and dirty milk, foul air and filthy soil. He is proud of the water of his well, which sparkles with the gases of decomposition; he points to sewer-men, who, he says, are notorious as pictures of health.

Now this kind of person Tuberculosis has been flogging so hard that at last he is beginning to wince, and even to have misgivings of the Creed of the Obvious. He is beginning to open his eyes to see that in Nature there is no small and great; that from the minutest creature the greatest calamities may ensue. If the microscope has not revealed to us angels dancing on the point of a needle, yet it has demonstrated to us that malignant bacilli dance there in scores, and, tiny as they are, hour by hour are wasting our treasure and destroying what is dearest to us. Thus, tuberculosis is beating into the farmer, the milkman, the cheese-and-butter-monger, the butcher, nay, into every mother and every nurse, that tubercle is but one of a host of invisible foes preying upon us and upon those dependent upon us; that in any sausage, in any tin of meat, in any mutton-pie, in any glass of milk, nay, in the most secret recesses of any oyster, an ambush may be laid for us. Really, Nature is too bad. What is Common Sense to do? Before such minute, faddy, fantastic, pedantic, eccentric, and yet subtle and deadly perfidy as this, what is the Cult of the Obvious to do? Such foes cannot be drummed out, or punched out, or kicked out, or batted out. To outwit them we must condescend to the lore of the bookworm, to the science of the pedant, to the arts of the hermit of the laboratory.

From the day when Hobbes ridiculed the useless ingenuities of Boyle, twitting the founder of chemistry with his whim for remote and eccentric experiments instead of dwelling in contemplation of the obvious, from Hobbes's day to the present, the flogging schoolmaster—the bacterium—has been hardly, but surely, constraining the man of common sense to cry "*Peccavi.*" He who has been so proud of muddling along without "experts" has had to swallow the unpalatable truth, that the expert is he who holds the secret of the

shortest, cheapest, and most effective work. Koch, the recluse, pursuing microscopical fads instead of rolling pills, has helped us on the way to save millions of lives at the age when life is dearest and most useful to the community. Ross, the faddist, who could not satisfy his mind with military routine and empirical doctoring, verified Manson's hypothesis, and established it as the theory of malaria; thereby not only saving valuable lives, but also converting thousands of miles of fruitful land, desolated by fever, into healthy habitations. Lister also, who grew sick of common-sense surgery, and found the housemaid not good enough for him, to the derision of sensible men, took to frittering away his time and his talents in minute and fastidious scrupulosities.

"But," says the man of common sense, who is not soon to be silenced, "these new lights, if lights they be, ought to be hidden under a bushel; because if exposed they will cause a panic." Now there is nothing your practical man fears as he does a panic; if there be plagues, if there be rottenness, they must be covered up. To hold out a beacon-light to warn ships of a sunken rock may cause a panic among sailors; so put out your light even if meanwhile a few more ships be lost.

Now in his warning against a panic our counsellor plausibly suggests that the public may lose its head; but inwardly he means by a panic disturbance of vested interests—in air, which may be foul; in milk, which may be dirty; in houses, which may be standing on dung; in wells, which may be poisoned; in slums, which may be pestiferous. A few more babies may die, a few more parents may be crippled; but we must have time to sell out, to make the season's profit, to get a grant for our schools, to get the municipal elections over, or to hedge against any other possible loss or inconvenience. Let the people be kept a little longer in the dark.

But the flogging schoolmaster flogs on; flogs on, till the toughest back begins to smart, and the victims begin to recant, and to confess that useless studies are full of utility, that pedantic scrupulosity about the infinitely little is statesmanlike appreciation of the infinitely large; and that the bookworm, the pedant, and the hermit of the laboratory shall be made rulers of the kingdom. And it is about time.

Listen to an extract from a medical journal :—

"It is calculated that we spend in the United Kingdom upwards of a million sterling every year, through the poor-rates alone, on the victims of pulmonary tuberculosis. Moreover, of the 42,000 who die annually of this disease, the majority are between twenty and forty years of age, that is to say, they are lost to society just when they are in a position to make good the cost of their maintenance and education. The mere loss in wage-earning power is estimated at from ten to twelve millions annually. It follows that any means, however costly to begin with, which will have for the effect to materially reduce this prodigious waste of life and working energy, ought, in the end, to prove a remunerative outlay to the community." (*Medical Press and Circular*, 1901.)

We are boldly preaching, no doubt, that tuberculosis is an infection, but at the same time we are showing that the infection may be avoided by readily-practicable means.

We have learned that phthisis is spread, not so much from person to person directly, as indirectly by the aggregation of people in close and badly-cleaned workrooms; in large Post Offices, in asylums, in industrial works, in overcrowded houses. We have learned that in public places and vehicles it is propagated by spitting and by the spray of the cough; and to know this is to prevent the disease.

Again, if we are to prevent tuberculosis, we must know where it is; the paths and places which it frequents: and how are we to know this unless such information be collected? The chief objection to compulsory notification in phthisis is the difficulty of detecting the disease in the earliest stages; but we are learning another lesson—that, if we postpone the cure until the disease is manifest, we shall lose half our patients, whereas if caught in the incipient stage 80 per cent. may be cured. How are the victims to be discovered in this stage? By the establishment of dispensaries or departments of dispensaries for tuberculosis, whither those persons among the poor may resort, who cannot afford to visit a private physician every time they are a little "off colour." This dispensary method, very successfully introduced in France by Professor Calmette, should be established in all large towns. And, until notification can be made universal, voluntary notification must be encouraged, as it

is in New York, in Manchester, and elsewhere, with the greatest advantage to the community. It is thus that the public institutions, the factories, the workrooms, and the slums in which the disease flourishes, may be reported and reformed. Under voluntary notification, a very useful amount of information can be collected, without any improper interference with individual liberty. In Manchester, or in New York, we hear of no resentments, of no hardships; while, on the other hand, on the facts of these towns conclusions of the utmost value are being worked out, and efficient means of prevention, cure, or relief are organised.

It is objected that the patient notified may be exposed to aversions or disadvantages on account of his misfortune; that he may lose his employment, or be shunned even by his own kin: this would be cruel indeed. But public apprehension has been awakened already; without any leakage from the confidential archives of the Medical Officer of Health, the victim of phthisis is now recognised quickly enough. We may hope indeed that the knowledge that proper precautions are being taken will calm undue timorousness; for we are learning that defence from infection depends upon a few definite and not difficult precautions; especially on the proper catching and destruction of the spittle and spray. Already well-informed laymen are laughing at the silly, selfish woman who, at the sight of a patient's "shelter," sniffs at her vinaigrette and sidles off; or at the local authority which opposes the erection of a sanatorium, lest it be a source of infection in its vicinity. I repeat that the methods of arresting infection are now so well known, and can be carried out so easily, that only when these methods are grossly neglected should alarm arise; then "panic" is welcome, and remedial, and I could wish there were more of it. The patients, the public carriers, the heads of Government departments and of factories, the superintendents of lunatic asylums, the masters of workhouses and others, who wilfully, supinely, or ignorantly endanger others, or allow the conditions of tubercular infection to exist, are not to be treated too tenderly.

It has been proclaimed, during the last few months, that in our study of tubercular infection, in the hunt of the bacillus, we have forgotten, or let slip, the factor of individual susceptibility;

that in studying the seed we have forgotten the soil. Now this proclamation seems to me so far from just, indeed so surprisingly unjust to many indefatigable and beneficent labourers in the field, that I would not have regarded it, had not that certain physicians of well-deserved eminence, and wielding thus a merited influence in the country, started or joined in the cry. It is twenty years since Koch discovered the bacillus, and since that time much, no doubt, has been sought and learned concerning its qualities and capacities; but, important as these advances may have been, they are not so much nor so radical as to have altered the main bearings of that cardinal discovery, as propounded by Koch himself. When, however, we turn from the seed to the soil, we find that our knowledge of the behaviour of the tissues and juices under the crop, and of the channels of propagation of the seed, have made far greater advance; not only so, but our discoveries of the properties of the "soil" have been radical—have indeed transfigured our former conceptions. In this connection, even in a public meeting, the names of Metchnikoff and of Ehrlich can scarcely be omitted. So vital indeed has been the change of conception wrought by such pathologists as these, that, for my part, the very word "soil" seems to have become so unfit, that one may be allowed to wonder at its use by physicians, who declare their preference for the study of susceptibility to that of the infectious element itself. Surely the admirable work lately done on susceptibility has proved that the bacillus, so far from finding in the human body a "soil"—that is, a medium more or less proper and conducive to the germination of the seed—finds, even in the weakest subjects, a medium in which its presence is resented from the beginning, and from which, in a vast majority of cases, it is successfully repelled. Every human being resists the insemination; happily most men discard it at once; some are more or less unsuccessful; a few succumb. But a medium which generally prevents insemination, which generally resists germination, which always enters into conflict with the germ, and at some stage or other often stops its growth, is not well called a "soil." Now the study of these tissue-reactions, as they vary in individual men, in various human stocks, and in animals and plants, even down to the minutest inhabitants of air and pool; and of the subtle defensive processes by which, even

in these last, insemination is resisted, or the toxic emanations of the seeds prevented or neutralised—this study, so far from falling into relative neglect, has given birth to conceptions so far-reaching and so marvellous, as, in my opinion, to surpass in wonder, and also in importance, the discovery of the tubercle-bacillus itself.

And this is not merely in respect of pathological doctrine; the investigation of the "soil," if I must use the word, has led also to new practical methods, to revolutionary methods of dealing with phthisis by physicians; and happily, I may add, to a revolution in our results also: despair has been turned into hope. Such indeed has been the vogue of this therapeutical revolution that we might with more show of reason pretend that, in studying and in fortifying the "soil" (that is to say, the resources and degrees of individual defence), we have insisted less than we might have done on grappling directly with the bacillus, on which we are said to have bestowed too exclusive an attention.

Direct attempts to attack the bacillus after it has effected a lodgment in the body seem likely to remain long enough within the sphere of the experimental pathologist. Meanwhile, the duty of the physician and his lay coöperators is clear, namely, to throw all our energy, and the enthusiasm bred of our recent exploits, into the work of testing our weapons and strengthening the fortress against the assailant; and, if a breach have been made, into the succour of the forces of defence. Although the enemy may have gained a footing in the outer bailey, the success of these efforts has put new heart into the garrison. We know our weapons better than we did, and we find ourselves in possession of larger stores of ammunition than we had dreamed of; but the commander must be supreme and alert, the fight must be incessant, the watch must never sleep.

Such must be the campaigns of the sanatorium. Even if the enemy have encamped in our precincts, it can be driven out. But it is better still to scout for this insidious foe, and to get into touch with it before it is upon us; not by any means to dally with its first assaults till it has entrenched itself within our domains.

An opinion has been held by physicians at home and abroad,

physicians of the highest authority, that in most cases, perhaps in all, it is during childhood that tubercle establishes itself in the human frame. This opinion I would not propose to you too confidently; yet, as a broad and effective aphorism, I believe it to be not unveracious. And if this be so, it points to a still more jealous care of our children. The passage of tubercle from parent to child is so rare as to be negligible; the disease is usually incurred during the years in which the child inhabits the floor, and inhales its dust. Again, the fungus may be taken in with the food; or by licking pencils and slates, by sucking dirty finger-nails, and so forth. The nursery, then, should be scrupulously clean to the very corners, the floors being laid with a washing material, and all parts of plinths and the like made accessible to the damp cloth. Dry dusting is to be forbidden absolutely.

But I fear that, thus or otherwise, we cannot hope very soon to prevent tuberculosis in children; for years to come it will find access to them, and work in them after all its manifold forms. But in view of the opinion that inoculation of it in early life may often be the origin and, although not primarily manifested, the source of an outbreak many years later, no work can be more important than the provision of sanatoriums for delicate children, such as exist in a small way at Margate, and on a large and most beneficent scale at Ormesson, near Paris. Sir H. Weber has done well to press this need earnestly upon the charitable public.

The sanatorium for children must be no part of an institution for adults; moreover it is more important for children to be at the seaside. A wealthy city, like Glasgow, could build and maintain such a sanatorium at a very small cost. I trust some benevolent citizen will found a home of the kind. To the city itself I dare not suggest it lest I should hear a voice murmuring "Municipal Socialism." Benefactors are, I think, deterred by the heavy cost of the institutions already erected. It is good that, after the manner of the King's Sanatorium, there should be a few large institutions, perfect in staff, in scope, and in plan, and provided with all that science can excogitate in the way of practice and investigation: but I would urge that, as a rule, and especially for children, a group of cheap dwellings on the "cottage" system would

be more home-like, would be cheap, both in first cost and in maintenance, and would give good results.

It has been well urged that the uses of the sanatorium are twofold—the curative and the educational. If the patient —I now return to adults—can stay but three months in one of these health-factories, the marvellous restorative powers of the open air will be brought home to his experience, as well as to his intelligence. By open air his fever is cooled, his nerves are braced, and his appetite is reïnvigorated. The best sanatorium for the individual is the coldest which he personally can tolerate. In toleration of a low temperature individuals differ widely; and all lose something of the power as they enter middle life. There is no evidence that sunlight is of importance, except as an amenity; it seems to me to have no direct influence on the disease. From such an institution the patient goes forth, far from cured it may be, but instructed in his drill, and with the virtue of fresh air so engrained in his physical habit, that henceforth he may work out his own salvation—if, that is, he can have some control of his future circumstances.

Above all things, I repeat, the patients must be caught early. What we are to do with advanced and probably incurable cases is a difficulty into which I cannot enter now; it will, I hope, become a disgrace to us to permit such cases to arise. If, then, we are to save lives and treasure, we must have some agency whereby we can detect and remove the early cases; and if throughout the kingdom we provide dispensaries, or departments of dispensaries, for this purpose, and submit the patients to systematic treatment before the malady has made deep inroads, 70 to 80 per cent. of the more chronic cases may be cured.

Finally, I have to consider certain reproaches thrown upon the medical reformer, who from the time of Plato to the present day has been accused of busying himself in preserving weedy lives and in counteracting the benefit of the survival only of the fittest—in propagating, in fact, bad stocks.

Now what are bad stocks? It is for those who accuse us of propagating them to tell us. Suppose I take the Pelagian point of view, and argue that no stocks are primarily bad; that a bad stock means a line of careless or unfortunate mothers,

untoward parturition, bad feeding in infancy, ill-cooked and ill-chosen food in childhood, frowsy dwellings, close courts and yards, vitiated air, lack of playgrounds, stupid or injurious schooling, and the abiding defects imprinted on the growing body by the passage of the myriad infections of which tubercle is but one. Nay, a distinguished physician of your great neighbour-city, of Edinburgh, no visionary but an accomplished pathologist and a sober and thoughtful observer—Dr. Ballantyne—has recently published a work on the diseases and the treatment of disease in the unborn infant! Do not let us talk of bad stocks till we have done our best with them; for we may discover that it is rather the gardeners than the stocks which are bad. Let us first examine ourselves and our own opportunities and responsibilities in the gestation, birth, nurture and development of the children, and when we have finished this interminable task, we may set about the elimination of the residue. I see, indeed, no more blight or blemish in a specific susceptibility to tubercle than in a specific susceptibility to Scarlet fever or to Syphilis, to arsenic or to lead, or to the rest of such poisons; and if we are to eliminate all persons quick to catch this and that infection, or to break down under this or that poison, the survivors will be a motley batch. For we do not know that such susceptibilities stand in any direct relation to the general health other than this — that the faculties of a body enfeebled by any incidental cause appear to be less powerful in defence against the chance invader than those of the same body in vigour. But such an enfeeblement is an adventitious, not an original, defect; a defect not of stock but of nurture: and it is the part of public medicine to remove the causes of enfeeblement and distortion, and to eliminate not us, but the cloud of poisons which besets us. To lie passive, quoting perverted Darwinism, till, under evil conditions which we have not tried to remove, our children have grown stunted and crooked, and then to grumble about the neglect of the physician to eliminate the unfit, is inhuman.

# NOTES ON URINARY CHEMISTRY.

By WALTER G. SMITH, M.D. (Dublin),

*Ex-President R.C.P.I.; Physician in Ordinary to H. E. the Lord Lieutenant; Physician to Sir P. Dun's Hospital.*

[With Plate XIV.]

## I.—ON LEUCIN AS A BULKY URINARY SEDIMENT.

In December, 1901, I was asked by a lady to examine the urine of her daughter, aged 23 years, whom I have never seen as a patient. The young lady has to be careful about her diet, but is, I am informed, in excellent health in every other way, except in one particular. For about two years, on and off, she has suffered from hypogastric pain and a frequent desire to pass water. These symptoms are especially troublesome at night, and the pain sometimes wakes her three or four times. The pain is, perhaps, worse after eating certain things, *e.g.*, rhubarb or uncooked apples, or if she has had claret for dinner.

The first specimen of urine which I received in December, 1901, showed no peculiarity of colour. It was acid, and free from albumen or sugar. It deposited a considerable white sediment, about $\frac{1}{3}$-inch in depth, which resembled in appearance an ordinary phosphatic deposit.

When examined under the microscope no crystals were seen either of uric acid or of octahedral calcium oxalate, and no tube-casts or organic structures of interest. The sediment was found to be entirely made up of:—

(*a*) Minute clear spheroids;
(*b*) Larger bright spheroids;
(*c*) Discoid bodies.

These last bodies were marked with fine concentric lines, and the periphery appeared granular, or else exhibited fine radial striæ. (*See* Fig. 1.)[1]

The urine was examined upon several occasions subsequently: twice again in December, and once in April, 1902.

[1] Cf. drawings in Gamgee's *Physiol. Chem. II.*, p. 240. Sheridan Lea, *Chem. Basis of the Animal Body*, p. 149. Neubauer and Vogel, *Analyse des Harns*. 1898, Tafel I., Fig. 5 (several forms).

None of the discoid bodies were observed a second time; but in the urine passed on December 4th and December 31st a few small clear spheroids were noticed, in association with ordinary crystals of uric acid and octahedra of calcium oxalate. In two specimens (April, 1902) only amorphous urates, free uric acid, and calcium oxalate were detected. After the morning's urine had stood for two days a few groups of bright, stellar, acicular crystals were seen.

I submitted the crystals to the inspection of several of my medical friends, and am much indebted to Dr. Alcock (at that time assistant to Dr. Purser, Professor of Institutes of Medicine), not only for his drawings of the crystals, but also for the trouble he took in the preliminary chemical examination.

However, as there were some points of difficulty regarding the solubility, and behaviour to reagents, of the crystals, I handed over the sediment (purified by washing with dilute alkali in order to free it from uric acid or urates) to Dr. Emerson Reynolds, who most kindly investigated the matter and supplied me with some valuable notes embodying his observations. The preliminary examination showed that the deposit did not contain uric, oxalic, or phosphoric acid; and had no reducing action upon copper salts.

The spheroids polarised light, and exhibited a central black cross.

The precipitate was insoluble in dilute alkalies, but was dissolved by HCl (25 per cent.), and by strong $H_2SO_4$.

From Dr. Emerson Reynolds' notes I extract the following data:—

A portion of the deposit was dried and examined.

(*a*) Heated in a melting-point tube it partially fused below 180° C., but did not completely liquefy even at 210°, indicating that it consisted of a mixture of two substances of different fusibility.

Ordinary leucin melts about 170°, but an isomer is known which does not melt at 210°.

(*b*) A portion heated more rapidly in a rather wider tube gave a feathery sublimate (a leucin character); and the residue charred with an unpleasant smell.

(*c*) The purest portions gave off ammonia freely when heated with soda-lime.

## PLATE XIV.

*N. H. A delt.*

Fig. 1. *Leucin.* × 500.

Fig. 2. *Methylene-urea.*

(*d*) A portion tested for sulphur did not afford any trace of that element.

The purified deposit was very slightly soluble in alcohol, the solution when filtered off and evaporated to dryness yielding a very faint residue. Ordinary leucin requires 1,040 parts of 98-per-cent. alcohol for solution at mean temperature. Impure leucin is more soluble in water and alcohol. Perfectly pure leucin crystallises in snow-white, glistening plates.

When another portion was boiled for some time with water, it partially dissolved, and the solution on evaporation left a residue which included some of the granules, and some more distinctly crystalline groups.

When the boiling aqueous solution was very carefully treated with neutral copper acetate and evaporated over sulphuric acid, a few perfectly distinct, rich deep blue (with purple shade) crystals were obtained, similar to those afforded by leucins.

All these properties point to the conclusion that the deposit included at least *one* leucin.

It is known that the amido-acids of the leucin type can furnish both chemical and physical isomers, which differ materially in melting-points, solubilities, and optical properties.

Leucins are amido-derivatives of caproic acid ($C_6H_{12}O_2$), the sixth term of the series of fatty acids. Leucin = $C_6H_{11}NH_2O_2$. There is reason to believe that, as a physiological compound, leucin is either :—

α–amido-(normal) caproic acid ; or,
α–amido-isobutylacetic acid.

This latter form is known to exist in three modifications, two of which are optically active, owing to the presence of an asymmetric carbon atom :—

$$(CH_3)_2.CH.CH_2-\left\{\begin{array}{c}H\\|\\C\\|\\NH_2\end{array}\right\}-COOH.$$

It evidently, therefore, may be a difficult matter, in a given case such as the present one, to decide whether only one leucin is present or not.

Schulze and his pupils have shown that optically inactive leucin (prepared from vegetable albumen) is α-amido-isobutyl-

acetic acid; and Dr. Bernhard Gmelin has carefully investigated the constitution of three leucins prepared from (*a*) yeast, (*b*) casein, (*c*) albumen of hæmoglobin. Their solubilities in water and alcohol varied considerably. Thus, at 19°, yeast-leucin and casein-leucin required 29 parts of water for solution, and hæmoglobin-leucin 45·8 parts. At 17°, casein-leucin required 1,385 parts of alcohol (99 per cent.). All three forms were dextro-gyrate.

Schulze converted the leucins into their corresponding oxy-acids, and then reduced these to the fatty-acid series, and his results appear to establish the identity of the three fatty acids so obtained with isobutylacetic acid, and not with normal caproic acid.

The causes of the differences in the properties of leucins from different sources may lie in :—

(1.) Chain-isomerism : *i.e.*, differences in the constitution of the fundamental fatty acid.

(2.) Position-isomerism : position of the $NH_2$ group relative to the carbon atoms.

(3.) Physical isomerism : *i.e.*, spatial relations of the atoms, or atom-groups, around an asymmetric carbon atom.

Now there are, theoretically, eight possible caproic acids, and seven of these are known. From these may be derived 31 isomeric amido-acids.

But, if we accept Schulze's and Gmelin's proposition that isobutylacetic acid is the parent acid, we may exclude the derivatives due to chain-isomerism.

From isobutylacetic acid four amido-acids are possibly deducible in virtue of position-isomerism. But three ($\beta$, $\gamma$, $\delta$) of these seem to be improbable from the known reactions of leucin, and hence we are restricted to the conclusion that leucin represents $\alpha$-amido-isobutylacetic acid.

There remains, then, only one adequate factor in explanation of observed differences in properties, viz., physical isomerism. Gmelin considers that the three dextrogyrate leucins which he has prepared realise the complementary form of the lævogyrate modification which Schulze obtained, by the agency of Penicillium glaucum, from inactive $\alpha$-amido-isobutylacetic acid. Accordingly we are led to the belief that differences in the properties of leucins may be concerned not solely with *one*

modification thereof, but may depend upon a varying mixture of optically active forms. For example, inactive leucin is the least soluble in water (1: 106 parts). Is it merely a molecular mixture, or, is it a compound molecule formed of two optically active moieties?

From his cryoscopic determinations Gmelin concludes that inactive leucin is only a molecular mixture, and is not a true compound, such as :—

$$H_2 = N - C_5H_{10} - COOH$$
$$HOOC\,C_5 - H_{10} - N = H_2.$$

Similarly, with alanin and glycocin. (*Zeitsch. für physiolog. Chem.*, XVIII., 1894, 21.)

Of the physiological or pathological significance of leucin little can be said. All are agreed that it is a decomposition-product of proteids; and, as regular end-products of albumen-disintegration, we find leucin, tyrosin, and asparaginic acid. The two last compounds are aromatic derivatives. The peculiar odour from the axilla and between the toes has been thought to be associated with decomposition-products of leucin (Hammarsten), but this is doubtful.

According to Radziejewski most organs of the body yield a little leucin (Neumeister, *Physiolog. Chemie*, I. 254), whereas tyrosin is not found normally in perfectly fresh tissues.

Leucin is very rarely found in urinary sediments, and I do not know of any previously-recorded case in which it has appeared as a macroscopic sediment in bulk, and unassociated with tyrosin.

Neubauer and Vogel (*Analyse des Harns*, 10 Aufl., 1898, 280) go so far as to state that it is not to be looked for in urinary sediments. Nevertheless, leucin and tyrosin have occasionally been observed to separate in the crystalline form spontaneously from pathological urines, but, as a rule, special procedure is needed to secure their crystallisation. Tyrosin is less soluble than leucin.

In regard to prognosis we recognise that the amido-acids, leucin and tyrosin, have been discovered in the urine chiefly in cases associated with rapid destruction of liver-cells, *e.g.*, acute yellow atrophy of the liver. Yet Herter states that he knows of "instances of obscure febrile disease in which these bodies have appeared in the urine for several days in succession,

and in which the patient has made a good recovery." (*Lectures on Chem. Pathology*, 1902.)

In the *Brit. Med. Journ.*, Sept. 4, 1880, p. 381, there is an abstract of a paper by Dr. E. C. Anderson, who states that he had detected leucin and tyrosin in the urines of a large number of cases representing most diverse conditions. Sometimes he found leucin alone, sometimes tyrosin only, and sometimes both. He recorded only cases in which leucin and tyrosin existed in the urine in very appreciable amount; and he believes that leucin is probably present in small amount in the urine of most people, except those in the highest state of health who lead temperate active lives.

I do not know of any confirmation of these somewhat surprising statements.

### APPENDIX.

Leucin has been reported as having been found, pathologically, in:—

(1.) Acute yellow atrophy of the liver. In the blood, liver, and urine.
(2.) Acute phosphorus-poisoning. Liver and urine.
(3.) Cirrhosis of the liver. Liver and urine.
(4.) Continued fevers: typhus and variola. (?)
(5.) Leuchæmia. In the blood.
(6.) Cholera-stools.
(7.) Gangrene of the lung. In the sputum.
(8.) Pus and dropsical transudates.
(9.) Atheroma.

Some of these observations need confirmation.

## II.—ON A REACTION BETWEEN UREA AND FORMALDEHYDE AND ITS CLINICAL SIGNIFICANCE.

Some time ago, wishing to examine microscopically a patient's urine, which was turbid with amorphous phosphates, I cleared it with acetic acid, and added a little formalin for preservation until I had leisure to examine it next day. The urine was free from albumen and sugar. Next day I noticed that a white deposit had formed in the urine. This was separated by

the centrifuge and when examined under the microscope was found to consist wholly of:—

(*a*) Discoid bodies.
(*b*) Very small oblong and oval bodies, single, or arranged in pairs; somewhat resembling large bacteria.

The discoid bodies appeared granular with a radial striation, and many of these were split at one side, probably owing to pressure. They stain with methylene blue (Earl), and are doubly refractive, showing a dark cross similar to that of a starch-granule (W. H. Thompson).

At first sight the discs recalled to mind the microscopic characters of leucin, but closer examination soon dispelled this idea.

Since neither I nor any of my medical friends had seen anything exactly similar previously, the question arose—What was the nature of the deposit? One naturally thought of a possible interaction between formaldehyde and some constituent of the urine, the most likely being urea.

Dr. Earl had found that by adding formalin to healthy urine a similar deposit could be obtained, and I ascertained that an aqueous solution of pure urea, when mixed with commercial formalin, slowly deposits a white sediment which consists entirely of the discoid bodies above described, about twice the diameter of a red blood-disc. The deposit is very insoluble in water and alcohol, and is not easily attacked by acids or alkalies in the cold.

I next consulted Dr. Emerson Reynolds, Professor of Chemistry in the University of Dublin, and I am much indebted to him and to his assistant, Mr. E. Werner, for information, and for references.

It is well known that aldehydes, especially the lower members of the series:—

(*a*) Readily polymerise.
(*b*) Are prone to form condensation-products with other substances.
(*c*) Act as reducing agents.

A familiar example of polymerisation is afforded by the substance known as *paraform*, which is sold in the form of tablets for purposes of disinfection.

The concentrated aqueous solution of formic aldehyde not only contains gaseous formaldehyde, $CH_2O$, but also the hydrate, $CH_2\begin{cases}OH\\OH\end{cases}$ and probably other hydrates.

On complete evaporation of the solution the solid anhydride, paraformaldehyde, is left—possibly diformaldehyde, $(CH_2O)_2$.

As an example of a condensation-product may be cited the preparation known as urotropin. If a little liquor ammoniæ be added to commercial formalin, and the liquid cautiously evaporated to dryness, the two gaseous bodies unite, with exit of water, and a white solid remains, which is urotropin :—

$$6\,C\,H_2\,O + 4\,N\,H_3 = 6\,H_2\,O + (C\,H_2)_6\,N_4$$

= hexamethylene-tetramine.

Chemists have long been acquainted with the fact that urea unites with aldehydes in the cold, and Dr. Emerson Reynolds investigated some of these reactions 30 years ago. At that time formaldehyde did not come under consideration. Now methylene-, ethidene-, and ethylene-ureas have been prepared.

Within recent times several communications have appeared in respect to the combinations of urea with formaldehyde, and I will briefly refer to them,

In 1889 Hölzer and Lüdy prepared from formaldehyde and urea the simple combination $C_3H_4N_2O$.

The constitution of this compound may be taken as either

$$CO\left\langle\begin{cases}N.CH_2\\NH_2\end{cases}\right. :$$

or as,

$$CO\left\langle\begin{cases}NH\\NH\end{cases}\right\rangle CH_2 \text{ (Lüdy).}$$

This latter formula would correspond to methylene-urea, and the reaction for its production is—

$$CO\langle^{NH_2}_{NH_2} + CH_2O = H_2O + CO\langle^{NH}_{NH}\rangle CH_2.$$

This compound decomposes at 200° with evolution of ammonia and at 240° melts to a brown liquid, which solidifies on cooling, and the residue is soluble in hot water. (*Ber. der Deutsch. chem. Gesellsch.*, 17,659 : 18,3302 : 29,2751. Cf. Lüdy. *Wien. Akad. Ber.* 118, II., b. 191).

In 1896 and 1897 Goldschmidt further investigated the products of the interaction of carbamide (urea) with formalde-

hyde. He obtained a compound, $C_5H_{10}N_4O_3$, which corresponds to 2 molecules of carbamide + 3 molecules of formaldehyde, and its probable constitutional formula is :—

$$NH_2 . CO . NH . CH_2 . CO . CH_2 . NH . CO . NH_2.$$

He suggests that this reaction might possibly be used for determination of urea, since the precipitation seems to be almost quantitative.

The urea was dissolved in dilute HCl and treated with excess of formaldehyde. The precipitate is not acted on by alkalies, but is decomposed by strong acids. (*Ber. der chem. Gesellsch.* 1896. Bd. III. 2,638.)

In another communication Goldschmidt states that carbamide, when allowed to remain along with excess of formaldehyde (40-per-cent. solution) in alkaline solution, yields a white precipitate, $C_3N_2O_3H_8 = CO.(NH.CH_2.OH)_2$, which is soluble in hot water, and is precipitated by alcohol as a gelatinous mass. After two recrystallisations from water it appears to be transformed into $C_6N_4O_5H_{14}$.

In a neutral solution he finds that the chief products are the above, $C_3N_2O_3H_8$; and a body, $C_5N_4O_5H_{14}$, insoluble in water (*Journ. Chem. Soc.*, April, 1898, 178 ; from *Chem. Zeit.*, 1897, 21,460).

In this conflict of formulæ I will adopt as the simplest Lüdy's expression for methylene-urea, $CO\langle^{NH}_{NH}\rangle CH_2$, which is accepted in Richter's *Organic Chemistry*, 1900, p. 400.

I could not detect any reaction, at least no precipitate was found, upon mixing aqueous solution of thio-urea (sulpho-urea, Reynolds) with formalin.

F. v. Hemmelmayr, however, has obtained the parallel compound methylene-thiocarbamide, $CS\langle^{NH}_{NH}\rangle CH_2$ by mixing together equal weights of thiocarbamide and chlor-methylalcohol. A white precipitate is formed which is almost insoluble in all ordinary solvents. (*Monatsh.* 12.89.)

I likewise failed to observe any evidence of reaction between uric acid (urate of potassium) and formaldehyde in the cold, but, according to Weber, Pott, and Tollens, diformaldehyde-uric acid ($C_5H_4N_4O_3.2\,CH_2O$), can be readily formed, and it

behaves as a weak monobasic acid. (*Journ. Chem. Soc.*, February 1898, 66 ; from *Berichte*, 1897, 30.2514.)

Since formaldehyde is now so frequently employed as an antiseptic, and has probably often been added to urine as a preservative, it is somewhat surprising that the reaction now described has not been, so far as I know, recorded.

To the clinical physician the relationship of formaldehyde to urine presents three points of practical interest :—

(1) It yields with urea a white precipitate (probably methylene-urea), which might easily be mistaken for leucin.

(2) If present in urine formaldehyde will reduce the copper-test, and so introduces a fallacy in testing for sugar.

(3) Formaldehyde interferes with the detection of small amounts of albumen by means of heat and acetic acid.

# A LECTURE ON MELANOMA.

(DELIVERED AT THE LONDON HOSPITAL, FEBRUARY 7TH, 1902.)

BY FREDERIC EVE, F.R.C.S.,
*Surgeon to the Hospital; Member of the Court of Examiners, R.C.S.*

[With Plates XV., XVI., XVII.]

GENTLEMEN,

TO-DAY I propose to speak of melanoma, or melano-sarcoma, as it is usually called, a disease which is sufficiently rare to be of interest, and sufficiently common to be of distinct practical importance.

Melanoma occurs in the following situations:—In the first place, in the skin; secondly, in the matrix of the nail; thirdly, on certain muco-cutaneous structures, viz., the labia, the penis,[1] the eyelid,[2] and the anus; fourthly, on mucous membrane, such as the palate and the inner surface of the cheek; fifthly, in the eye; and sixthly, cases have been reported in certain rare situations, such as the ovary and epididymis.

These growths are most common in the skin and the eye. We will consider first those originating in the skin, the majority of which commence in a mole. Out of 45 cases which have occurred during the last 20 years in this hospital, 33 were situated in the skin, and in 26 the growth probably originated in pigmented moles. The mole usually enlarges, but does not reach any considerable size; occasionally it may attain the dimensions of a walnut. In other instances it ulcerates superficially and bleeds, with or without noticeable enlargement. In a third group no apparent change takes place in it. In a fourth the disease commences as a superficial deposit of pigment in the skin without any definite tumour-formation. Again, the evidence that the neoplasm originates in a mole may be wanting, or it may spring up in a scar. In a few instances the statement is made that the mole was scratched or irritated.

The following is an example of a melanoma originating in a scar. A lady, 55 years of age, came to me with a

[1] *Cent. f. Chir.*, Tom. XXVII., 1900, s. 114. [2] Ibid., Tom. XIX., 1892.

melanotic tumour on the sole of the foot. She stated that 20 years previously she wounded her foot on the sea-shore. A slight thickening of the part remained, and three months before she came under observation the thickened spot began to enlarge. At the time when I saw her there was on the sole, over the head of the fourth metatarsal bone, a projection the size of half a marble, which was superficially ulcerated. One slightly enlarged gland was felt in the groin.[1] In October, 1896, the three outer toes and metatarsal bones, with a considerable area of healthy skin around the growth, were removed. A year later I removed the femoral and inguinal glands, which had progressively enlarged. In January, 1899 (two years and a half from the time when the swelling was first noticed), she died with recurrence in the groin, ascites, and probably secondary growths in the liver; but there was no recurrence in the sole. The above may be taken as the ordinary course of a melanoma originating in the skin.

Among the most remarkable examples of this disease are those cases in which it commences as a thin layer of pigment on some part of the skin without any definite tumour. The following case will illustrate this variety:—The patient, a lady, aged 39, stated that 10 or 12 years before she came under observation she ran a splinter of wood under the skin of the right thumb. The blood accumulated under the skin, and subsequently a black spot remained. This pigmented spot gradually spread. One or two years before she came under observation she pricked this black patch, then as large as a threepenny-piece, and a superficial excoriation formed, which did not heal. Later a slightly raised whitish area appeared at the centre of the patch. The condition when I saw her is depicted in Fig. 1.

There is a level patch of black pigment with a slightly raised pale area at its centre, and towards one side is a rough scaly patch looking like dry eczema.

There was one enlarged gland above the elbow, but no palpable enlargement of the axillary glands. I excised the growth on the palm with the enlarged epitrochlear gland. An

[1] It was stated that this glandular enlargement had existed for many years, dating from an attack of eczema. The glands were not removed, at the express request of the relatives.

Fig. 1. *Melanoma of Palm.*

**The dark black surface was perfectly flat and even with the surrounding skin. It consisted of an infiltration of pigment only.**

incision through the skin over the axilla revealed numerous slightly enlarged glands filled with black pigment. The axilla was therefore cleared out. The operation was done in January, 1900, and the patient died with cachexia in the following September, about nine months after the operation and at least 11 years after the commencement of the disease.

I will now quote examples of melanosis in which the glands and viscera become affected without any perceptible enlargement of the mole. When asked to examine any case of obscure glandular enlargement, especially if the glands present the ordinary characters of malignancy, the possibility of the existence of this disease should be borne in mind. The following is a case in point :—

A woman, aged 30, was admitted to the London Hospital supposed to be suffering from parametritis. There was a hard fixed mass in the right iliac fossa just above Poupart's ligament. The physician in charge found no uterine trouble, and suspected that there might be appendicitis. On examination I found that the enlargement in the right iliac fossa was due to a growth in the iliac glands, and an examination of the skin revealed a soft pigmented mole, about the size of a pea, near the umbilicus ; scattered over the abdomen there were three smaller ones. I had no doubt that the disease of the glands was secondary to changes in the mole.

The next case is very conclusive. A man, 45 years of age, died soon after his admission to the hospital. At the necropsy the liver was found much enlarged by melanotic growths, for the existence of which no explanation could be obtained, except the presence of an ordinary pigmented mole on the back.

I will cite yet another case in illustration of this condition. It is that of an elderly gentleman who consulted me on account of some enlargement of his right inguinal glands. The glands were markedly enlarged, firm and movable, and I thought that in all probability they were due to some past eczema or other irritation. Some months afterwards he began to suffer with right sciatica. I therefore made a more careful examination and came to the conclusion that the disease of the glands was malignant, and that the growth had spread to the iliac glands, the sciatica being due to pressure on the lumbo-

sacral cord. A close examination of the skin revealed an ordinary mole on the outer surface of the thigh just below the buttock.

It was proved later that this was a true case of melanoma by the fact that he developed a curious form of diffuse pigmentation of the skin sometimes seen in this disease. In his case it was confined to the face, neck, and shoulders. He subsequently died from cachexia with visceral disease.

The situations in which melanomata of the skin occur may be gauged by the following statistics of 164 cases, 145 of which were collected by Dieterich and 19 by Wagner. Of these 164 cases, in 32 the primary growth was on the head, in 11 on the neck, in 47 on the buttock, and in 57 on the extremities. In 16 the growth was multiple. The vast majority of cases occur after the age of 50; thus in half Wagner's 19 cases the patients were over 50; and in the majority of Dieterich's cases between 40 and 60. Of the 45 cases of melanoma of all kinds occurring at our hospital in the last 20 years, 37 were over 30 years and 8 under 30 years.

Occasionally the disease occurs in early life; thus in Dieterich's series five patients were between the ages of 1 and 10, and two were between 10 and 20.

We will now consider the sequence of events subsequent to the lighting up of the primary disease. As an almost invariable rule, the nearest chain of lymph-glands becomes affected. Out of 14 cases which occurred here during the last six years there was only one exception, and that was a man of 30, who had a pigmented mole near the right angle of the jaw, which began to enlarge four years before he came under observation. A year later he noticed a swelling beneath the mole. On admission there was a subcutaneous swelling the size of a shilling, and upon this there was a pigmented mole. No enlarged glands were felt. The growth was excised. Six months later he re-appeared with a local recurrence, but still no evidence of glandular infection.

When the extremities are affected nodules may be observed in the lymphatics leading from the primary growth to the nearest chain of lymphatic glands. Or, again, nodules in great numbers may be disseminated in the subcutaneous tissue over the whole of the body.

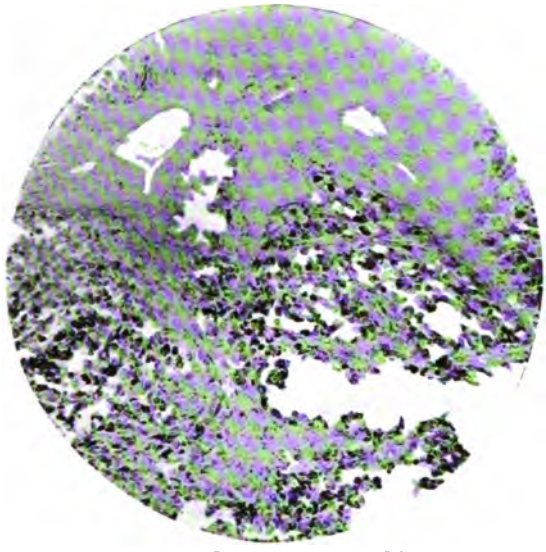
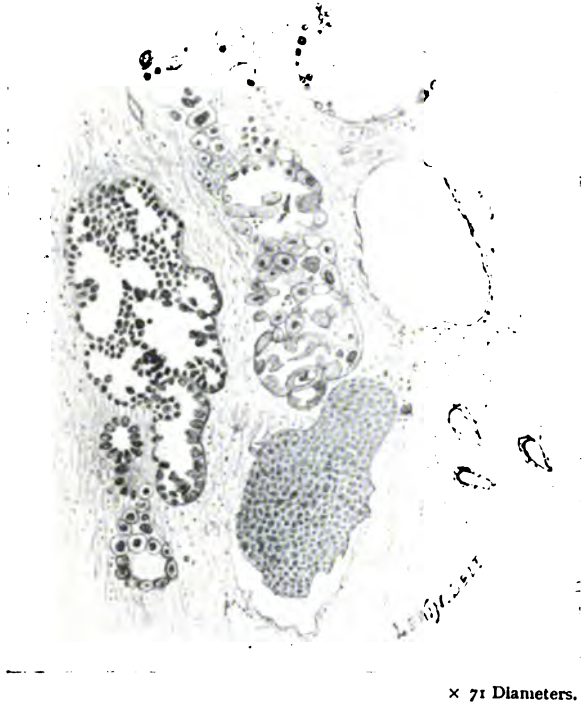


Fig. 2. *Melanoma of Skin.*

Showing the distribution of pigment in and between the cells, and in the interstices of the surrounding connective tissue.



× 71 Diameters.

Fig. 3. *Melanoma of Skin.*

From the same section as Fig. 4.

Very soon the viscera become the seat of metastatic growths through dissemination by the blood-vessels. Nodules are found in the liver, kidneys, spleen, lungs, brain, bones, and in some instances in almost every tissue of the body.

Pigment may be demonstrated in the blood, the leucocytes containing granules of pigment or melanin. Pigment also may be excreted in the urine, which is described, in some instances, as sage-green in colour. Usually, however, when passed it appears natural, but after it has stood for about half an hour the pigment is deposited.

The tendency to the formation of secondary growths in the liver does not appear to be so great in the melano-sarcoma of the skin as in the case of primary melanosis of the eye, nor is the excretion of melanin in the urine so frequent. In 13 out of 14 cases of melanoma of the skin, the liver was unaffected, and there was no melanin in the urine. On the other hand, in four post-mortem examinations on patients who had died with visceral disease following melanotic sarcoma of the eye, in all the liver was markedly affected, and melanin in the urine was noted in three instances. These facts are suggestive and merit further inquiry. It may be that the presence of melanin in the urine only occurs in those cases in which there is extensive involvement of the liver or widespread visceral disease.

Occasionally little black flecks appear on the skin; such an one may be seen on the middle digit in the drawing (Fig. 1). There were also similar flecks on the fore-arm and a few on the shoulder. They resemble the flecks seen sometimes in blondes from sunburn.

On section these tumours present the ordinary fleshy appearance of sarcomata. The amount of pigment varies greatly: the greater part of the tumour may be dotted with pigment; there may be a general diffused pigmentation of a sepia-brown colour or of an inky blackness; and in some instances the primary growth contains little or no pigment, while the secondary growths in the glands and viscera are deeply pigmented.

The microscopic structure also presents considerable diversity. The tumour may be composed of round cells, which are occasionally very large, almost like epithelial cells (*see* Fig. 4);

or it may be composed of mixed round and spindle-shaped cells, or of spindle-cells alone. In the case of tumour of the sole related above, the structure was that of a round-celled sarcoma containing many giant-cells.

In some instances, but by no means invariably, the section has in part, or over the whole of it, a distinct alveolar structure, the cells being arranged in groups between the connective-tissue trabeculæ; or groups of round cells lie in spaces formed by trabeculæ of spindle-cells. The pigment is in the form of granules, for the most part distributed within the cells, but also in the interstices between them and in the connective tissue. Pigment may also be deposited in the tissues beyond the growth and cellular infiltration; and cases have been reported in which a deposit of pigment has occurred in the serous membranes, in muscles, and in other parts of the body without any cellular proliferation.

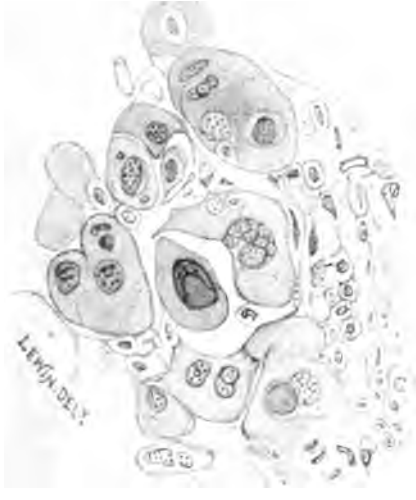
Whitfield[1] observed, after bleaching the pigmented tissue, definite changes in the cells. He, therefore, concludes that the pigmented area around melanomata of the skin is not only potentially malignant, but actually so.

In connection with this fact it is interesting to report an observation by Lanz. He injected into a guinea-pig a certain amount of melanotic growths from the brain, liver, and spleen. The animal died a month and a half after the injection and showed collections of pigment in the skin, subcutaneous tissue, muscles, peritoneum, spleen, liver, and kidneys. The pigment must have been formed within the animal's body, since very little of the colouring matter was injected.

The average duration of life in these cases is about two or three years. It is generally stated that the melanomata are the most malignant of tumours, with the exception, perhaps, of the small round-celled sarcomata, and this is generally true. Nevertheless there are certain remarkable exceptions. In the case of melanoma of the palm recorded above, the disease ran a course extending over 11 years from start to finish. Another very remarkable example of this fact occurred in my Wards not long ago. A woman presented herself with enlarged glands in the axilla and melanotic growths in the lymphatics on the inner side of the upper arm. Twenty years previously a melanoma

[1] *Brit. Jour. Dermat.*, August, 1900, p. 274.

# PLATE XVII.




× 320 Diameters.

Fig. 4. *Melanoma of Skin.*

Showing the epithelial character of the cells.

on the dorsum of the hand had been excised. Ten years later she again came with a local recurrence, which I removed. This is, therefore, an instance of a patient living 20 years after the excision of the primary growth. A similar latency may be observed in melanotic tumours of the eyeball.

It may appear a contradiction to say that the sum of the pathological and clinical characters of the so-called melano-sarcoma indicates the growth to be a carcinoma.

Writing in 1891 a short article on Tumours[1] I expressed myself as follows:—

"From the foregoing account it may be noted that the melanotic sarcomata of the skin closely approach the cancers, in that they possess an alveolar structure, often an epithelioid type of cell, and in the fact that they originate in connection with a structure (the skin) itself pigmented—derived from epiblast; and further, as in cancers, the lymphatic glands are early affected.

"I have myself observed in two instances melanotic tumours continuous with tap-like ingrowths of the epidermis, as in epithelioma; and for these reasons am compelled to believe that these tumours are really, in many instances, cancers originating in patches of imperfectly-developed skin, such as moles."

I may add that some of these tumours are, in anatomical arrangement, definitely epitheliomata. Since the majority of them occur in moles which may be looked upon as congenital defects, I can only suppose that the ill-defined character of the cell-elements is due to the fact that the epiblastic cells from which these tumours spring are imperfectly differentiated.

In 1893 there appeared a very important paper by Unna (*Berliner Klin. Wochenschrift*), in which he contended that malignant growths originating in moles are the result of a down-growth of epithelial cells, with snaring off of the down-growth by connective-tissue cells—in fact, that all melanomata growing from moles are really carcinomata. This view has been supported by many pathologists, latterly by Whitfield[2] and Max Abbaser,[3] and is generally accepted.

*Treatment*:—The treatment of melanoma of the skin can

[1] Mansell Moullin's *Surgery*, p. 130. [2] Op. cit.
[3] Virchow's *Arch. Bd.*, 166, Hft. I., p. 40.

be given in few words, *i.e.*, free excision or amputation, in accordance with the position and extent of the disease. The removal of the nearest chain of lymphatic glands, whether palpably enlarged or not, should never be omitted; for it may be taken as a matter of certainty that in the great majority of cases they are infected.

In one case, that of the tumour of the sole mentioned above, I tried Coley's fluid, but without any resulting improvement. It is stated by Coley and others that in some instances benefit has been derived from this treatment.

Let me now briefly call your attention to cases of melanoma occurring in rare and unusual positions.

During the past six years there have been in our hospital three cases of melanoma springing from the matrix of the nail. In the previous 14 years there was no example of it. The great toe was involved twice, and the little toe once; the hand is rarely affected. The growth commences beneath the matrix of the nail or in the adjoining skin, often ulcerates and fungates, soon spreads to the lymphatic glands, and, in fact, follows the same course as melanoma of the skin.

In one case the duration of the disease from its commencement until death was four years. The patient was a man, aged 23 years, with a melanotic growth on the little toe, which was reported to be a spindle-celled sarcoma. In the other two cases the great toe was affected. In neither of them was the liver involved, nor was there melanuria.

During the period mentioned there were three examples of melanoma on muco-cutaneous or mucous surfaces; one on the vulva, one on the palate, and one on the inner surface of the cheek, but no case of melanoma of the rectum was treated.

The two former occurred under the care of my colleague, Mr. McCarthy, and that on the cheek under my own care. These cases being rare, I give brief notes of them.

*Case* 1.—Melanoma of the vulva. The patient, aged 42, had always noticed a "small blue vein" on the left labium minus. The growth appeared six months before admission. There was a black warty growth on the left labium minus at the junction of the middle with the anterior third; there were some hard enlarged glands in the axilla, but no other glands were enlarged nor was there enlargement of the liver.

The growth and glands were removed. On section the glands were quite black.

*Case 2.*—Melanoma of the palate. A female, aged 37, was admitted to hospital in August, 1888. She first noticed, nine months previously, a small blister on the right side of the palate, and on looking in a glass saw a small lump the size of a pea and of a black colour. This bled from time to time, but she took very little notice of it. On admission nearly the whole of the palate was of a bluish-black colour, and toward the middle were two small black tumours, each about the size of a pea. There is no note as to treatment or condition of glands. She was in hospital again in July, 1889, and then there was an irregular soft growth extending over the whole of the hard palate, bleeding easily ; and the glands in the neck were extensively involved. The growth was scraped. She came in again three months later and it was scraped, and a third time three months afterwards. She finally came in and died two years and four months after the first appearance of the growth. At the post-mortem examination deposits were found in the lungs and brain, none in the liver or other abdominal viscera.

*Case 3.*—Melanoma of the cheek. The patient was a female, aged 27. The growth started as "a pimple" four and a half years before admission. Two years after it was first noticed it was removed, but recurred two years later. On admission there was a melanotic tumour of the right cheek fungating into the mouth, with local glandular involvement. The liver was not enlarged, and no melanin was present in the urine. The fungating portion was scraped and cauterised.

A case of melanotic tumour of the ovary was recently operated on by my colleague, Dr. Herman. The growth was a large round-celled alveolar sarcoma containing pigment in the cells.[1]

A well-marked example of melanoma of the epididymis has also been recorded by Rydygier.[2] The patient was a doctor, aged 42 ; and the globus major on each side was occupied by a spindle-celled tumour containing pigment.

In relation to the view that most melanomata are of

[1] Reported by Dr. Th. R. Andrews, *Obstetl. Soc. Trans.*, Vol. XLIII., 1901, p. 228.

[2] *Centralblatt f. Chirurgie*, T. XVIII., 1891, s. 140.

epithelial origin, it may be remembered that both of the foregoing organs may be the seat of dermoids.

With regard to melanotic sarcomata of the eye, their structure, like those of the skin, is variable. Of 18 cases reported by Lawford and Treacher Collins, in eight the cells were spindle-shaped, in one oval, in five round, and in five mixed. The majority of the tumours contained a good deal of pigment.

While certain growths arising in the ciliary bodies are carcinomata, the clinical course of the ordinary melanoma of the eye is that of a true sarcoma; and in this respect it differs considerably from that of melanoma of the skin. Secondary growths rarely involve lymph-glands, but on the other hand there is a great predilection for the occurrence of secondary growths in the liver, which, as far as I have been able to ascertain, does not exist to the same extent in cutaneous growths. Metastases are also prone to occur in the lungs and pleuræ and in the ribs, but at times they are widely disseminated. Melanuria also appears to be a common symptom.

The malignancy of this disease is of a somewhat lower degree than that of melanoma of the skin. Thus, of 79 cases traced by Lawford and Collins, 20 cases were living three years after the removal of the eye, and 19 cases were still living under three years after the removal of the eye. In 26 of the cases which died, death was due to metastasis, and in these the liver was affected in 16 instances.

A remarkable latency has been observed in this disease after removal of the eye. The patient may remain well for long periods, and then ultimately die with clinical manifestations of secondary growths in the liver. This is very well shown in two cases that occurred in this hospital. One patient died seven and a half years after removal of the eye, and the other ten years after.

The eye-trouble may excite so little attention that a patient may be admitted to hospital for enlarged liver and ascites, the intra-ocular tumour being unsuspected until the post-mortem examination reveals the condition of the liver.

In conclusion, my best thanks are due to our Surgical Registrar, Mr. Sherren, for the great trouble he has taken in looking up facts and cases for me in our Surgical Registers.

# AN OPERATION FOR INCONTINENCE OF FÆCES DUE TO RELAXED OR PARALYSED SPHINCTER ANI.

By A. W. MAYO ROBSON, F.R.C.S.,

*Consulting Surgeon to the General Infirmary at Leeds; Emeritus Professor of Surgery in the Yorkshire College of the Victoria University; Vice-President, R.C.S. of England.*

I FEEL sure that surgeons generally will be glad to know of any method that holds out a hope of relieving an ailment, the treatment of which has in my experience been almost universally a failure by any other procedure. Moreover, as paralysis of the sphincter ani is frequently the result of too vigorous surgery, in the shape of excessive stretching of the sphincter, or removing part of it in the method of ablation of hæmorrhoids by complete excision of the pile-bearing area—an operation to my mind quite unnecessary and often performed with more zeal than discretion—it is of great importance for the reputation of the surgeon that he should be able to remedy the distressing state of affairs; for whether it happens in the case of man or woman, incontinence of flatus or fæces is one of the most dreadful afflictions that can happen to anyone, since a patient who may be otherwise well in every respect is shut out from social intercourse and rendered utterly miserable.

Perhaps the idea of the operation suggested below may have occurred to others; if so, I have not seen or heard of it.

It occurred to my mind some time ago, when repairing a perineum torn into the rectum, where I had to pick up and bring together the widely-separated ends of the sphincter muscle in order to cure incontinence of fæces, that a modification of the operation might be effectual in curing the distressing condition of incontinence of fæces, which is not infrequently seen unassociated with ruptured perineum, and in fact in the male as well as in the female. I have since put my idea into practice with gratifying success. The following case affords a good example :—

The patient, a middle-aged woman, was under my care in the General Infirmary at Leeds, and the history has been furnished by my house-surgeon, Dr. J. C. Forsyth. Previously to November 1900, she was quite well except for piles, which caused her considerable local distress, and necessitated an operation at a neighbouring hospital. Complete ablation of the pile-bearing area was performed. Two days after the operation the patient's bowels were first opened, and since that date she had had complete incontinence of fæces and flatus. She had at times since the operation suffered from diarrhœa, but even under ordinary circumstances she had been unable to control her motions. In consequence she had been debarred from social intercourse and had led a life of great misery; as although she had been re-admitted to the same hospital, and had sought other advice, very little hope of recovery was held out to her, and her only relief was in the use of opium to keep the bowels confined. She was less troubled when resting in bed, but the incontinence was especially marked on rising from the recumbent posture. On examination there was no rupture of the perineum, but the anal orifice was patulous, and there was no perceptible contraction of the sphincter on the finger when this movement was attempted voluntarily by the patient.

The following operation was performed in November, 1901:—With the patient in the lithotomy position, a semilunar incision was made at the junction of skin and mucous membrane around the anterior half of the anus, as shown in Fig. 1, and this was deepened about ¼ to ½ inch. The upper and

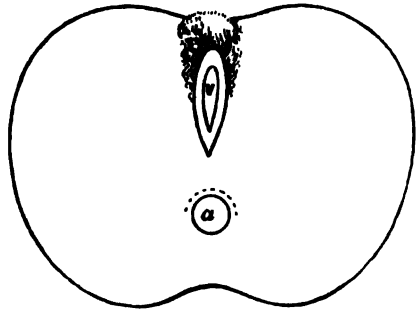



Fig. 1.

*a*. Anus. *v*. Vagina. The dotted line shows the position of the incision.

lower margins were then separated by being drawn apart by means of forceps, so as to make the semilunar slit into a lozenge-shaped cavity, as in Figs. 2 and 3; and this cavity was then closed by bringing together the sides by buried catgut sutures and the skin by silkworm-gut sutures as in Fig. 4. It will be seen that the wound is entirely external to

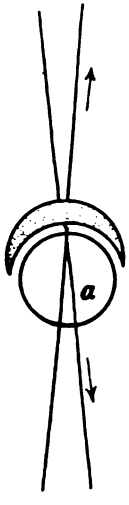



Fig. 2.

Fig. 3.

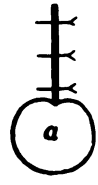



Fig. 4.

**Figs. 2, 3, and 4. *a*. Anus. The dotted area shows the wound pulled open, the arrows showing the directions of traction. In Fig. 4 the anus is shown reduced in size, and the wound closed by sutures.**

the bowel and that it diminishes the size of the anus; but it does more than merely contract the orifice, for it restores the power of the sphincter muscle.

The patient made a smooth recovery, and the sutures were removed on the tenth day. From the day of operation she was able to control the anal orifice; and when seen some weeks later, she was quite well, and said that the incontinence had completely disappeared.

The operation probably acts in one or both of two ways: (*a*) by shortening the sphincter muscle, and thus enabling it to grip the anal orifice; or (*b*) by bringing together the torn ends of the muscle. Whatever may be the explanation, the operation answers the purpose for which it was designed.

# FOUR CASES OF SNAP- OR TRIGGER-FINGER.

By HAROLD L. BARNARD, M.S., F.R.C.S.,
*Assistant Surgeon to the London Hospital.*

THE first three cases described below were shown at the meeting of the Medical Society of London, held on November 11th, 1901. The condition is, I think, of such comparative rarity, and the cases present so many points of interest, as to make it worth while to place them on record.

*Case* 1.—Mrs. T., aged 40, was sent to me by Dr. Margaret Alden. She complained that the right middle and ring-fingers, and less so the little finger, snapped when she flexed the first inter-phalangeal joints. This condition had existed for seven or eight years, and she attributed it to wringing clothes. When the weather was damp and cold, the condition and the pain which accompanied it were much worse.

On examining these fingers it is found that they snap down on flexion, and that considerable effort is required to extend the first inter-phalangeal joint again; indeed on one or two occasions the middle finger has been fixed in flexion, so that she has had to call in a doctor to extend it again. Whilst she is making the effort to extend the joint, the terminal phalanx is quite loose, and will "wobble" up and down freely. On placing the finger over the palmar surface of the heads of the metacarpal bones, whilst the corresponding finger is flexed and extended, a nodule can be felt slipping up and down as the snaps occur. These nodules are very tender on pressure, and are presumably situated in the tendons of the flexor sublimis muscle. No treatment has benefited the condition in the least, and she does not care to be operated on for it.

*Case* 2.—On June 2nd, 1900, Annie B., aged 30, presented herself at my Out-Patients' Department at the Metropolitan Hospital complaining that she had lost the use of the top joint of her left thumb.

She said that she was a maker of artificial flowers by trade, and used the left thumb very much in her work. The loss of control over the top joint prevented her from carrying on her

trade. She had been quite unable to flex the top joint of her thumb for three months, but previous to that time this joint had snapped up and down when she used it, and on several occasions it became fixed down, so that she had to extend the joint with her other hand. On these occasions it gave her severe pain. At last it became permanently fixed up, so that she could not flex it at all.

On examining the left thumb I found it quite loose, so that passive flexion to a right angle was easily effected without pain. The patient could not, however, do this herself. There was no sign of any other paralysis, or of anæsthesia in the distribution of the median nerve, nor were any of the other digits affected.

On placing a finger-tip just above the sesamoid bones in the insertions of the flexor brevis pollicis, a painful nodule was felt; and this moved up and down on passive movements of the top joint of the thumb, and became fixed between the sesamoid bones when the patient attempted to flex the joint herself. A diagnosis of a nodule in the tendon of the flexor longus pollicis was made, and for a fortnight this was tightly strapped over Scott's dressing, and rest was ensured by the application of a splint. At the end of this period, as the condition was not in in the least improved and the girl was unable to follow her vocation, I decided to explore the nodule.

On June 16th, 1900, I made a curved incision over the nodule on the front of the head of the metacarpal bone. The fibrous sheath of the tendon was divided for about an inch, and the tendon was then hooked out. On examining the tendon between the finger and thumb the nodule was found to be situated deep in its substance, producing a slight fusiform enlargement. The surface of the tendon was as smooth and glistening at this point as at any other, but the supple strap-like tendon here became hard and more rounded. As I did not feel justified in resecting the nodule, I left the tendon-sheath open and divided the ligament between the two sesamoid bones, until the nodule slipped freely up and down on passive movements of the top joint of the thumb. The skin was then sutured. Healing occurred by first intention.

At the end of the week the patient was encouraged to move the top joint of the thumb, and some slight clicking occurred. This clicking soon disappeared, and at the end of three weeks

the only drawback to the treatment was that the tendon pulled slightly upon the skin in full flexion.

The patient was seen again on November 12th, 1901. The tendon is now quite free from the skin. There is no obstruction to the gliding of the tendon, and she is able to carry on her work as an artificial-flower-maker as well as ever she did.

The feel of the nodule in the tendon suggested to me the sesamoid bone which is often found in the tendon of the Peroneus longus muscle, and I would suggest that it may have been an aberrant sesamoid fibro-cartilage. Its short duration would, however, discredit this view.

The chief point of interest about this case is that the existence of the nodule on the tendon led to complete loss of power of flexion of the terminal phalanx of the thumb, the condition thus closely simulating paralysis of the flexor longus pollicis.

*Case* 3.—May F., aged 11 months, was brought to my out-patient department at the Metropolitan Hospital because the terminal phalanx of her right thumb became fixed in flexion for long periods. When it was flexed in this position, she had power of further flexion and could use the thumb freely, but the terminal phalanx was continuously bent.

When an attempt was made to extend the joint it was found to be fixed and it was only after considerable force had been used, and some little pain produced, that it went up with a snap. A definite nodule could then be felt, above and between the sesamoid bones of the flexor brevis pollicis, which moved with the terminal phalanx.

The child would then keep the joint extended for a long period; and however much it used its hand, did not flex the terminal phalanx of the thumb more than 45°. After a time some strong contraction of the flexor longus pollicis would pull the nodule below the sesamoid bones, and the joint would once more be fixed in flexion.

The child was of the Mongol type, and will probably turn out to be mentally deficient.

This case is chiefly of interest because of the youth of the child. The youngest cases I have been able to find in the literature were 5½ and 6 years. I am waiting for the child to grow older before interfering with the tendon.

*Case* 4.—W. B., a little boy, aged 2½ years, was under the care of Dr. Wise of Walthamstow, who asked me to see him. For a year his parents had noticed that the top joint of his thumb was at times fixed at a right angle and at other times straight, but that it could not then be flexed. The thumb would remain in one or other position for long periods at a time and for the last fortnight had always been flexed at right angles. The child did not complain of any pain, and, curiously enough, this case did not pass through any stage in which the joint snapped in a characteristic manner.

On examining the child I found the top joint of the right thumb flexed and fixed, so that no reasonable amount of force would extend it. A nodule could be plainly felt wedged below and between the sesamoid bones, and this nodule moved with the tendon of the flexor longus pollicis when the joint was further flexed. It will be seen that the jamming of the nodule between the sesamoid bones produced a pseudo-paralysis of the joint in this case as it did in Case 2, but that in the former patient the thumb was straight and could not be flexed, whilst in this the thumb was flexed and could not be extended. The operation consisted of a simple incision over the nodule and the sesamoid bones. The fibrous band uniting the latter was incised and the tendon-sheaths opened for about ¾-inch. The tendon was hooked out, and the nodule located in its substance as in Case 2. The top joint of the thumb was then fully flexed and extended in order to see that the nodule had room for free movement. The sheath was left open and the skin sewn up with a continuous sterile catgut stitch. Dr. Wise, who assisted me at the operation, writes to me that the dressings were removed on the tenth day, when the sutures had been absorbed and the wound had healed. The joint was then passively moved, and in a short time the child had perfect control over its thumb.

*Synonyms.*—As might have been expected from the striking symptoms of this curious complaint, many characteristic names have been applied to it. In England it is known as jerk-, spring- or trigger-finger. In France it has always been known by the name Nelaton applied to it, *doigt à ressort.* In Germany it is called *schnellenden oder federnden Finger.*

Notta, of Lisieux, first described it in 1850, and Nelaton

fully investigated it in 1855. The best account to be found in English is in H. A. Reeves' *Bodily Deformities*, 1885, and the subject has been treated recently in Tubby's *Deformities*. A very complete account is to be found in Duplay Réclus's *Traité de Chirurgie*, tome viii, page 504, whilst Abbe has figured several cases in the *New York Medical Journal*, 1894.

*Ætiology*.—One of the conditions which produce snap-finger is rheumatism, probably by producing nodules in the tendon or leading to ecchondroses in the first interphalangeal joint. Many of the cases have been attributed to blows or to the excessive use of the finger affected. My first case attributed her condition to washing and wringing clothes, and several such cases are to be found in the literature.

In another instance snap-finger came on after a man had been holding a heavy fishing-rod for several hours. A good number of the cases, however, arise without obvious cause.

The great majority of the cases of snap-finger have occurred in women (14 out of 19 cases, Blum). Nearly all the patients are more than 14 years old. Palaillon has, however, reported a case in a little girl, 6 years old, and O. Berger in a child of 5½ years. My third and fourth cases are therefore of interest on account of their ages—11 months and 2½ years respectively.

The thumb is more often affected than any of the fingers, and then, in order, the ring, middle, little, and index fingers.

Reeves collected 28 cases, which were arranged as follows :—

| | |
|---|---|
| Thumb - - - - | 11 |
| Ring-finger - - - - | 9 |
| Middle finger - - - | 6 |
| Little finger - - - - | 1 |
| Index finger - - - | 1 |

Blum also classifies 28 cases with an almost identical distribution.

When we consider the mechanism which produces snap-finger, we are compelled to conclude that several varieties exist, and that the snapping of a finger may be due to changes (1) in the tendon, (2) in the tendon-sheath, or (3) in the joint which snaps.

The most typical cases are undoubtedly due to changes in the tendon, producing a local enlargement which snaps

below the osseo-fibrous arch opposite the metacarpo-phalangeal joint, or, in the case of the thumb, between the two sesamoid bones and beneath the ligament which unites them. Such enlargements of the tendon can not only be felt, in many cases, moving up and down with the tendons, but they have actually been seen during operation and demonstrated to Anatomical Societies. Thus Blum, having cut down upon such a nodule, found it to be composed of hypertrophied synovial fringes attached to the tendon. He removed these and the patient was completely cured.

Carlier demonstrated to the Anatomical Society of Paris a case in which the enlargement was due to a small fibrous growth in the profundus tendon.

In two of my cases when the tendon of the flexor longus pollicis was hooked out during the operation, a firm nodule was found in it, producing a fusiform enlargement, which would not slip between the sesamoid bones until the ligament between the latter had been divided.

Equally clear cases have, however, demonstrated that the cause of the snap may be in the joint. Koenig amputated such a finger, and demonstrated an irregularity on the articular surface which produced the trigger-action. Walther has shown a similar specimen from an old woman ; whilst it is clear that the lateral ligament of the inter-phalangeal joint, by slipping over an ecchondrosis projecting from the side of the joint, would produce a snapping action.

Many other theories have been advanced, but we have only referred to those supported by specimens or actual observation during operation. One theory, however, seems to require to be refuted. It is that snap-finger might be produced by contraction of the fibrous arch opposite the metacarpo-phalangeal joint without any change in the size of the tendon. It is clear that such a contraction would produce a continuous obstruction during the whole of flexion and extension and not an interrupted obstruction, above and below which movement is perfectly free.

*Treatment.*—Many of the cases, especially those due to sudden injuries, appear to have been evanescent, and, for such, rest on a splint with pressure from a pad placed over the

swelling, and later massage, appear to be the suitable and successful treatment.

But where there is a definite nodule which has persisted for a long time, it appears to be right, as Tillmann says, to expose the tendon and, when the sheath has been opened, to proceed according to what is found—either removing the mechanical obstacle or overcoming the disproportion between the tendon and its sheath. The above cases will have made it clear that, where synovial fringes exist, these should be removed; but where a fibrous nodule is buried in the tendon, it is better to make room for its passage up and down by removing a part of the fibrous ring. The most scrupulous aseptic precautions must be adopted throughout.

# ON THE MICROCOCCUS OF ACUTE RHEUMATISM.

By E. W. AINLEY WALKER, M.A., M.D. (Oxon.),
*Gordon Lecturer, Guy's Hospital.*

## I.—ACUTE RHEUMATISM IS AN INFECTIVE PROCESS.

It is hardly necessary at the present day to discuss the question of the infectiveness of acute rheumatism. Leaving aside the consideration of the indeterminate and conglomerate mass of ill-defined conditions, which are too frequently spoken of without sufficient evidence as "rheumatic," there is a definite disease, most typically manifested in young subjects, which is thoroughly well recognised by all clinicians under the name of acute rheumatism.

From the clinical and hygienic aspects this disease presents all the characters of an infective illness. It is to some extent endemic in certain areas; it exhibits at times a tendency to epidemic prevalence; and it presents the stigmata of an attenuated septicæmia. That it is due to an irritant circulating in the blood is evidenced by the concurrence of pyrexia, rapid anæmia, erythemata and purpura, polyarthritis, pericarditis, myocarditis, endocarditis, often albuminuria, and at times pleurisy, pneumonia, and nephritis; and that this irritant is of microbic origin is rendered probable by the frequency with which the onset of the symptoms can be associated with an antecedent pharyngeal inflammation, the familiar rheumatic tonsillitis.

The infective theory is further strengthened by the observed tendency of the disease to run a definite course in spite of treatment; to be associated with a marked paresis of the heat-regulating mechanisms, at times sufficient to induce hyperpyrexia; and to lead to other serious disturbances in the central nervous system. It is supported also by the occurrence of relapses. Clinically, therefore, the evidence of infectiveness is quite as clear in this disease as in ordinary pneumonia, typhoid fever, or the septicæmias.

Further, there exists a group of cases, terminating by so-called malignant endocarditis, which cannot, at any rate,

at certain periods of their course, be definitely marked off from acute rheumatism, and which must of necessity be taken into account in a consideration of the ætiology of the latter condition.

As regards chorea the relations are perhaps less definite, but most clinicians are now agreed upon its intimate association with rheumatism. Certainly it may be seen either preceding, closely following, or actually occurring in the course of acute rheumatism, whether in children or in young adults. Further, Lees and Poynton have adduced abundant proof that in the chorea of childhood, without other present or previous evidence of rheumatism, there is usually a definite cardiac affection.

In the course of the present article I shall endeavour to show that one and the same microörganism as is found in rheumatism is obtainable from cases of malignant endocarditis and from chorea; and on the other hand that the organism isolated from a simple rheumatism may produce in animals malignant endocarditis, and probably at times chorea also.

## II.—THE INFECTIVE AGENT IS SINGLE AND DETERMINATE.

As long ago as 1875 Klebs had detected microörganisms in cardiac valves which were affected with rheumatic valvulitis; and Popoff, in 1887, obtained cultures from the blood of rheumatic subjects, which on inoculation into animals gave rise to pericarditis, endocarditis, and arthritis. But until comparatively recently every successive observer appeared to find a different microörganism, and in some cases more than one organism, associated with rheumatic lesions; and the general tendency was to attribute the disease to a variety of agencies acting upon a particular type of tissue-soil, or to regard it as an infection by attenuated pyogenetic staphylococci or streptococci; while certain of its features were attributed to mixed infection.

The "mixed infection" theory, however, has absolutely nothing in its favour. We are acquainted with no other disease, possessing so distinct and definite an identity, of which the ætiology is "mixed." The mixed infections are characteristically suppurative or terminal infections. Even the attempt which has been made to separate some of the features

of acute rheumatism, such as pericarditis and pleurisy, or the formation of subcutaneous nodules over bony prominences, and assign them to "secondary" infection, is quite illogical and unsupported by the facts. It is to be met by the consideration that these phenomena are clinically just as much a part of the disease as are the arthritis, endocarditis, and pyrexia; and that, so far from being secondary in point of time, pericarditis or pleurisy may equally occur as the initial lesion of the disease.

Among the organisms which have been isolated from rheumatic cases by the earlier observers the most important were the staphylococci (Guttmann, Sahli, Maragliano, Singer), streptococci or diplococci (Netter, Maragliano, Singer, Dana, Apert and Triboulet, Litten), and a bacillus isolated by Achalme, and apparently confirmed by Thiroloix and Bettencourt, which gave a positive result in experiments on animals.

As regards the bacillus of Achalme and his supporters—a large anthrax-like, gas-forming anaërobe—which was definitely stated to produce rheumatic fever in animals, nothing remains to be said save that its distribution seems to be peculiarly limited; for beyond the fact that Hewlett is stated to have found it in an isolated fatal case of rheumatic fever, neither in England, nor in Germany, where a large amount of careful observation has recently been directed to the ætiology of rheumatism, has any similar organism been discovered. This is the more remarkable since the bacillus in question is of large size, and is a gas-producer. It has been suggested that this organism was probably the Bacillus enteritidis sporogenes, which has no particular relation to rheumatism.

Attention has, however, within the last few years been definitely centred upon an organism described by Apert and Triboulet in 1898. This microörganism is possibly identical with that discovered by Popoff in 1887, and was obtained by Westphal, Wassermann, and Malkoff in 1899 from a fatal case of chorea occurring in Berlin. In Wassermann's experiments it gave rise to polyarthritis and what he regarded as rheumatic fever in a series of no less than eighty rabbits. The discovery of Triboulet was naturally soon investigated in this country, where so many additions had already been made to our knowledge of acute rheumatism in its clinical aspects and on the side of morbid anatomy; and concurrently with the experiments

of Wassermann the subject was being carefully examined by Paine and Poynton. In their first communication these observers recorded the isolation of Triboulet's micrococcus in pure culture from twelve consecutive cases of acute rheumatism; and gave the results of animal experiments carried out on rabbits, which confirmed their conclusion that the microörganism in question was a specific cause of rheumatism.

Poynton and Paine have now obtained this diplococcus, as they themselves prefer to term it, from some eighteen cases of acute rheumatism, and have by its inoculation produced in animals the following lesions:—polyarthritis, pericarditis, myocarditis, endocarditis, pleurisy, nodule-formation, fungating endocarditis with visceral infarctions, and probably chorea. They have found the organism microscopically in nearly all the lesions of acute rheumatism; and have succeeded in cultivating it from a large number of them, including the blood and inflammatory exudations, cardiac valves, joint-tissues, and rheumatic nodules. More recently Fritz Meyer has taken up the subject in Germany, and has obtained very similar results.

The chief objection raised against their conclusions, at any rate in this country, has been the lack of confirmation during several years by independent workers of an organism apparently quite easy to cultivate and staining readily by ordinary methods. It was with a view to the possibility of verifying the results recorded that my friend Dr. Beaton and I, about a year ago, began an investigation of the bacteriology of acute rheumatism.

It may be briefly stated at this point that, as the result of our experiments, we agree entirely with the view expressed by Poynton some two years ago, in writing in this Journal on the ætiology of rheumatism, that a particular microörganism, and no other, is constantly associated with acute rheumatic lesions, and is their causal agent. Beaton and I have now obtained this micrococcus from rheumatic patients in fifteen cases, and have examined the action of four different specimens of the organism in healthy rabbits with positive results. Among our cases were eight of acute rheumatism—three of these uncomplicated, and five with old or recent morbus cordis, one having pericarditis in addition, and another an old adherent pericardium

—three cases of chorea in children, and four of malignant endocarditis in rheumatic subjects. The accuracy of the diagnosis in these cases must be accepted from the fact that they were all in one or other of the great general London hospitals, and most of them in Guy's Hospital under the care of Dr. Newton Pitt. The cultures were obtained either from blood taken during life or at the autopsy, or from the urine; and once from an articular exudation *intra vitam*. In the majority of cases the original cultures were pure cultivations of the micrococcus; and all the specimens which we used in inoculations upon animals were derived from cases in which the original cultures had been pure; namely, a case of acute rheumatism with endocarditis, two cases of chorea, and one of fungating endocarditis.

The organism in question is a tiny micrococcus, which is usually found, in ordinary films from artificial cultures, arranged in pairs and chains. When growing in the tissues, as, for example, in a cardiac valve, it shows marked pairing of the elements, but also the arrangement into streptococcal chains; and in artificial culture in particular media it can be made to exhibit chains of quite remarkable length. It stains well with ordinary dyes, such as carbol-methylene-blue, carbol-thionin-blue, and fuchsin; and it retains the stain when treated by Gram's method or by the Weigert modification of this method. Beaton and I have grown it in the following culture-media: bouillon, peptone-water, dextrose, saccharose, glycerine, lead, and nitrate bouillon, gelatin (stab, streak, and shake), agar-agar, glycerine-agar and blood-agar, blood-serum, milk, and potato. In our opinion it is in culture indistinguishable from an ordinary streptococcus. It forms a considerable amount of acid, no gas, no indol, no hydrogen sulphide, and no nitrites in nitrate media. It grows anaërobically as well as in aërobic culture. On potato there is no visible growth, but growth takes place in cultures made in sterile urine.

By inoculation intravenously in rabbits we have obtained the following effects: accute septicæmia, pericarditis, endocarditis with beady vegetations, pleurisy, and monarthritis or polyarthritis. We have indeed caused as many as four distinct attacks of polyarthritis in the same animal by as many successive inoculations of the micrococcus. A repetition of attacks

produces a most marked and apparently permanent effect upon the growth, the animals remaining under-sized, though otherwise in very good condition. We have found the organism in pure culture in the blood, in all the lesions, and in the urine of inoculated animals; and it maintained its cultural characters, and its effects within the living animal, unchanged by two or more passages through the rabbit's body, though probably its virulence was to some extent increased.

These results, confirming those obtained by Paine and Poynton, and by Fritz Meyer in Germany, are probably sufficient to establish definitely the constant and causal relationship of this microörganism to the rheumatic process.

Up to the present we have not produced fungating endocarditis in our experiments, though, curiously enough, one of our cultures has, in the hands of Dr. Vernon Shaw, given this result, associated with infarctions in internal organs. Paine and Poynton have, however, obtained a number of excellent examples of this condition. They have also seen what appeared to be chorea in the rabbit, both of the spasmodic and the paralytic types. This we have not produced hitherto, unless a case in which an inoculated animal, while suffering from an extensive polyarthritis, developed marked paresis, followed by paralysis of both hind limbs, the animal eventually recovering completely, can be taken as an example of paralytic chorea.

As regards the name applied to the micrococcus, Poynton, while admitting its resemblance to the streptococci, and its frequent chain-formation even in the living tissues, prefers to speak of it as a diplococcus. Others refer to it as a streptococcus or a strepto-diplococcus. Personally I am convinced from our own observation of our cultures and microscopic sections, and from an inspection of cultures and microscopic preparations and sections which were very kindly shown to me some months ago by Drs. Paine and Poynton, that the organism is indistinguishable by these methods from an ordinary streptococcus. In a routine examination it would undoubtedly be entered as a streptococcus; and I believe that the chief reason why its recognition has not become more general in this country is that attention has been too rigidly directed to the term "diplococcus" by a number of observers. The term

is one without the least importance in systematic bacteriology. It is gradually being abandoned by a number of bacteriologists; and since it appears to have produced an artificial barrier to the acceptance of valuable work, it might with advantage be replaced by some more general name, such, for example, as the *Micrococcus rheumaticus*. Quite a large number of observers have isolated streptococci from cases of acute rheumatic infection; and these, but for the impression conveyed by the name of diplococcus, might probably have been examined experimentally. At any rate, it may with reason be affirmed that a microörganism morphologically and culturally indistinguishable from a streptococcus is constantly associated with rheumatic lesions, and is the only organism so associated.

### III.—IS THIS ORGANISM AN ORDINARY STREPTOCOCCUS OR SPECIFIC?

Upon this question hangs the whole argument for the specificity of rheumatism. For the clinician rheumatism is a specific disease with its own definite and peculiar identity, and therefore *à priori* it might be supposed to have a specific causal agency for its production. On the other hand it is impossible to establish the specific character of an organism which is indistinguishable from an ordinary pyogenetic streptococcus. This is the position assumed and ably advocated by Gustav Singer, who holds the infection of rheumatism to be an attenuated streptococcic septicæmia.[1] The particular characters and identity which the disease exhibits must then be entirely attributable to peculiarities of the tissue-soil in the individuals who are susceptible to rheumatic infection. This is to push the conception of "diathesis" to its utmost limits; but the position is most difficult to overthrow. Yet the questions not unnaturally present themselves, Why then does the degree of inflammation present always fall short of the stage of suppuration? Why do not severe, and more especially the fatal, cases pass on to a condition of pyæmia? Why should the septicæmia always remain attenuated if the organism is an ordinary pyogenetic coccus? Yet suppuration is an extremely

[1] His claim that staphylococci also may produce the disease is quite without satisfactory support either from observation or experiment.

rare occurrence even in fatal cases of acute rheumatism, though it is not by any means unknown. Such questions, however, merely suggest inquiry; they do not furnish proof of specificity in rheumatism, although they point to some extent in that direction.

Certainly the organism obtained from a case of acute rheumatism can under suitable conditions evoke a production of pus in local lesions, just as can any other pathogenetic microörganism. But it is not necessarily on that account an ordinary pyogenetic streptococcus; nor does the fact strengthen the claim of Singer that rheumatism is non-specific, and is an attenuated form of ordinary septicæmia. Suppuration is merely a degree or stage of the morbid process known as inflammation: to look upon it as a distinctive feature is to fall back upon an obsolete misconception of the process. It is the degree of local irritation, not the particular nature of the irritant, which determines the occurrence of suppuration.

Accordingly, if the micrococcus of rheumatism be isolated in a virulent condition, or if it has been passed through several animals, it may produce a purulent arthritis, as occurred in the experiments of Wassermann. And Beaton and I have seen the joint-exudation in rabbits vary in different animals or different joints from clear or slightly flaky serous fluid, through turbid, up to definitely purulent, exudations; and the organism isolated from such a purulent arthritis has again in another animal, perhaps, produced a simple polyarthritis without any evidence of pus-formation. We have obtained suppuration in the subcutaneous tissue and in the peritoneal cavity in rabbits by suitable inoculations of the organism; and we have twice seen local suppuration in the ear associated with polyarthritis of non-suppurative type, from an inoculation part of which escaped through a puncture in the vein into the subcutaneous tissue of the ear. The question of suppuration has in fact but little bearing on the question of the specific, or the non-specific, character of the infective agent which we are considering.

Specificity can only be established, if at all, by the eventual discovery of some characteristic difference either in the micro-örganism or its products sufficient to distinguish it with certainty from the other members of the "streptococcus" group. Such differences are unfortunately still to be determined, if they

in fact exist. The organism in question is not capsulated; it is not specifically agglutinated by the blood of man or animals convalescent from rheumatic fever, at any rate so far as our results at present go; and it behaves in general like an ordinary streptococcus.

There does, however, exist a certain test which promises a definite result. Marmorek claims to have proved the identity of all the streptococci found in man—with the possible exception of that of scarlet fever—by the observation that they all refuse to grow in filtered culture-fluid in which a streptococcus has been previously grown and filtered out, though other organisms can flourish in such media. Beaton and I have tested two cultures of our rheumatic micrococcus on two occasions by the application of this method, and found abundant growth occurring in the inoculated fluids. The micrococcus, therefore, may be held to be specifically different from the streptococci. It is, however, too soon to speak with certainty upon this point; but if the result occurs with constancy, and especially if it be found to hold, *mutatis mutandis*, for ordinary streptococci planted into filtered cultures of the rheumatic micrococcus, we shall possess a definite proof of specificity for rheumatism. Till then we may justifiably hold a strong opinion that, considering all the evidence available, the rheumatic micrococcus is most probably specific, and is not an ordinary pyogenetic streptococcus.

## IV.—THE QUESTIONS THAT DEMAND INVESTIGATION.

In conclusion, it may be of interest to consider what are the points which urgently demand investigation. The first of these is obviously this question of specificity. So soon as the rheumatic micrococcus can be with certainty distinguished from all other micrococci which tend to grow in chains, we shall possess the definite and essential *point d'appui* from which to attack the vast array of clinical conditions which have been roughly grouped together as rheumatic or rheumatoid. And without trenching on the field of speculation, it is quite probable that not only in such conditions as osteo-anthritis, but also in some varieties of nephritis, for example, especially in the chronic forms, and probably in gout, much light may

be obtained from the clinical and experimental study of this microörganism.

When once the *bacterial* specificity of rheumatism has been accepted, the problem of its *toxic* specificity must be attacked. The nature of the acid formed in such profusion by the micrococcus, and the isolation of specific toxic products—questions already under investigation—are of the highest importance from the therapeutic point of view, as well as in their purely scientific aspect.

The pathways of infection also need renewed investigation. The importance of the tonsil as a point of entrance is already recognised, but there is evidence that the pulmonary area also demands attention. The incidence of the primary valvulitis on the left side of the heart, and on the mitral valve especially, is, as was pointed out to me by Dr. Cecil Wall, markedly in contrast with the usual seat of a valvular infection which has been conveyed by the systemic veins as in an ordinary septicæmia.

Finally, the attempt to obtain a specific therapeutic agent, which has already been made, apparently with some encouraging results, in Germany, and is at present being carried on in England also, is on the practical side of vital interest and importance to the art of medicine.

# TWENTY-NINE CASES OF SUNKEN NOSE, TREATED BY THE SUBCUTANEOUS INJECTION OF PARAFFIN.

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[With Plates XVIII. and XIX.]

Last September, I published in the *British Medical Journal* a short note on this method of treatment. I have now done 29 of these cases, and I should like to say in the present paper what I have learned from them. Of course, the falling-in of the nose is only one out of many surgical maladies for which these injections have been used; and the history of the use of paraffin, from Gersuny onward, is a curious chapter of surgery. But my experience, hitherto, has been all of nose-cases. I have taken every case that came to me, except one, where the defect was too trivial for treatment. Of the 29 patients, the youngest was 19, and the oldest was 52; 8 were women, and 21 were men. The numbers are about equal, of those whose noses were sunken by disease or by some congenital failure of development, and those whose noses had been driven-in by a fall or a blow. In many cases, it was 10, 15, or 20 years since the injury had been inflicted; in one case, it was half a century.

The deformity was of all degrees of ugliness, ranging from a mere depression across the nose, below the bridge, to absolute obliteration of the whole nasal arch, so that only the tip of the nose stood up from the face, tilted so that the nostrils looked not only downward but also forward. In two cases the nose was crooked, and had to be straightened with a Walsham's forceps at the time of injection. In one, there was destruction of a great part of the roof of the mouth; in one, there was severe ozœna; and in one, which is a striking example of the ravages of inherited syphilis, the patient had not only lost the shape of her nose, but also was almost stone-deaf, and nearly blind. In a considerable proportion (about one-third) of the 29 cases, there was destruction, more or less complete, of the

cartilaginous septum; and it is to be noted that a perforation of the septum, even a large one, does not make any difference in the success of the treatment.

Since fortune has brought me, in four months, so many cases, I shall assume an air of authority and assurance, in writing here, which will at any rate be a saving of space for other articles. I propose to consider these injections under the following headings:—

1. The melting-point of the paraffin.
2. The best sort of syringe.
3. The method of injection.
4. General results.

1. *The Melting-point of the Paraffin.*—When a new method in surgery begins to be known and accepted, there comes a period of uncertainty, because various modifications are announced, which may or may not be improvements. Gersuny's original paraffin, or mixture of paraffin and vaseline, which melts at 104° F., was challenged by Pfannenstiel's paraffin, which melts at 115°; and Pfannenstiel in his turn was challenged by Eckstein, with a paraffin melting at 136°. The battle of the paraffins is still raging on the Continent, and threatens to come over here. In the hope of preventing this, I should like to say that I am absolutely sure that Eckstein's paraffin has no sort or kind of advantage, and is inferior to a paraffin melting 25° lower. I used it in all my earlier cases, more than 12; it was the latest thing, and was said to be the safest, and therefore seemed likely to be the best. But it is hard to work with, it sets very swiftly, and it may inflict a veritable subcutaneous scald; for, of course, it must be used at a temperature some degrees higher than its exact melting-point. These defects might be borne, if they could be prevented by greater skill on the part of the surgeon, or if they were counterbalanced by any special virtues. But they are not; and I make bold to say that Eckstein's paraffin ought not to be used.

On the other hand, there is room for some faint distrust of Gersuny's paraffin, which melts at 104°. There is the statement made by Gersuny's first patient, that the paraffin became soft during an attack of typhoid fever, 13 months after the injection, when his temperature rose to 105°; there is the

Fig 1. *Before treatment.*

Fig 2. *After treatment.*

*Case of injury* (*May*, 1900). *Result not perfect, but some improvement in shape of nose.*

evidence of Comstock's experiments on rabbits; and the evidence of the occurrence of embolism, in this or that case, after the injection of mercury in oil. Surely we are bound to use a paraffin that cannot be influenced by "fever-heat." And, what is of more importance, we have to withstand the immediate and heavy pressure of the skin of the nose, suddenly raised and stretched after it has been lying flat for 20 or 30 years. This pressure may be heavy indeed; and, in one of my cases, a woman 52 years, whose nose had been sunken ever since she was two years old, I found it impossible, do what I would, to get the skin to rise sufficiently. Therefore, we must use a paraffin that sets fairly quickly and becomes absolutely rigid. Gersuny's mixture may set absolutely rigid; but it does not set so quickly as a paraffin with a rather higher melting-point. It comes to this, that the paraffin for sunken noses ought to melt somewhere between 105° and 115°; and I have made a fair trial of two paraffins, one melting at 115°, the other at 111°. They are both of them excellent; easy to use, setting quickly, but not too quickly, and not hot enough to do harm, while yet hard enough to stand heavy pressure.

2. *The Best Sort of Syringe.*—Eckstein's syringe,[1] unlike his paraffin, is the best that I have used. It has two great advantages; it can be easily worked with one hand, and it has a screw-nut on the piston, which prevents any risk of too much paraffin going in with a jerk. Moreover, being jacketed with a bit of rubber-tubing, it keeps its heat well. I have not tried the syringe with which Mr. Walker Downie has obtained very admirable results. I have tried an ordinary antitoxin-syringe, and a Schleich's infiltration-syringe, and also Mayer and Meltzer's syringe, which, I believe, is used by Mr. Cathcart; the copper jacket round the proximal part of the needle is an excellent device. I modified it, using a straight needle with an oval ball of copper round its proximal half, but this is no improvement. Mr. Walker Downie's plan of keeping the needle hot with a galvanic wire seems to me admirable, but it adds to the number of things that have to be looked after. On the whole, Eckstein's syringe is the best that we have at present, but we want something a little

[1] The paraffins, and Eckstein's syringes, are to be obtained from Mr. F. Rogers, 327, Oxford Street, W.

better; the needle is too long, too thick, and not rigid enough. I am using, at present, an Eckstein's syringe fitted with a straight steel needle an inch long; the body of the syringe, and the proximal half of the needle, are jacketed with bits of tubing, and there is a little washer between the syringe and the needle, where they screw together.

3. *The Method of Injection.*—The skin of the nose is carefully prepared, and the needles are sterilized by boiling. In every case, a general anæsthetic is given. The paraffin is melted, and is put in a water-bath, with the syringes. (It is best to have two syringes ready, in case of accident.) With a paraffin melting at 111°, the water-bath is kept at 118°—120°. The skin is nicked with a Hagedorn's needle, that the syringe may be used quickly and lightly. It is not advisable to stir up the skin with a tenotomy-knife. I did it once, and did harm instead of good. The paraffin can be trusted to raise the skin better than a tenotomy-knife; but, if the skin be rigidly puckered and adherent at any one point, from old necrosis of bone, it may be right to free it just there.

The assistant keeps up very firm pressure all round the nose, joining his fingers and thumbs in a ring, and taking the utmost care to protect the brows and the inner angles of the orbits. Five or six c.c. of paraffin are drawn-up into the syringe, and it is then held under water in the bath while the screw-nut is adjusted. Then the needle is dipped, for two or three seconds, into water that is boiling, or just off the boil. This is better than passing the needle through the flame of a spirit-lamp, which stains the paraffin, or makes it spit from the needle.

As a rule, it is best to make the injection from a point a little to one side of the middle line, below the place where the bridge ought to be, and to direct it upward, away from the tip of the nose. The needle is put well under the skin, and the paraffin is injected at or about the rate of 1 c.c. every ten seconds. In most of my cases I have found it necessary to make more than one puncture; and I believe that the best plan is to work quickly, and to get in the paraffin without loss of time, so that it may all be moulded together. The moulding must be done vigorously; the surgeon must not be afraid to squeeze the nose hard. He must take especial care to keep it

straight; to prevent the paraffin from straying to the forehead, or the eyelids, or the tip of the nose; to make the bridge fairly narrow and high, and to mould a good shape to the upper part of the nose; and to continue moulding steadily for 10 or 15 minutes, till the paraffin feels absolutely rigid. The punctures are then sealed with collodion, a mask of wet lint is laid over the face, and the patient must be carefully watched out of his anæsthesia, lest he turn over suddenly on his face, as one of mine did. So soon as he is himself again, a hand-glass is given to him, and he is told to mould his own nose gently, now and again, during the next few hours. No external splint is of any use at all.

4. *General Results.*—Every paraffin, as it sets, shrinks; and the hardest shrink the most. In a bottle, its surface is cupped; and in microscope-work, the paraffin used for embedding gets cupped and shrunk. The same thing happens with these nose-cases. Nearly all of them, a few hours after injection, are a little disappointing: they do not look quite so successful, in bed, as they did on the operating-table. In a few this shrinkage is hardly visible; but it happens in all, and nothing can be done to prevent it. In some cases, it just takes the edge off a very good result, but nothing worse than this. Something can be done, a few days later, by the injection, under cocaine only, of a little more paraffin; but this is not always so simple as it sounds; the second injection still leaves something to be desired, the profile remains still a little imperfect; and the surgeon dare not do more, for fear of doing too much. These two difficulties—the heavy pressure under the skin, and the natural shrinkage of the paraffin—are happily not serious; and, though they cannot be avoided, yet they may be discounted by the right use of the right quantity and quality of paraffin. Other difficulties, which are not inevitable, attend the moulding of the paraffin; and, among my 29 cases, there are some where more experience and more skill would have done greater good. The point is, not to attempt this method without very careful trial and rehearsal, so that one may know well how the paraffin behaves, and all its tricks of running, and setting, and shrinking; to be sure of the syringe; to inject, at a fairly quick rate, a fairly large quantity of paraffin—a badly sunken nose wants from 8 to 10 c.c.; to keep up very

firm pressure round the nose; to mould it vigorously and steadily, squeezing it without fear; and to go on moulding till the paraffin is absolutely rigid.

Is the method, in any way, dangerous? Certainly, there is no danger of poisoning by absorption: this has been proved a hundred times, both by experiment and by experience. Is there any danger of sloughing of the skin? There is a report that sloughing has occurred in one or more cases in the United States: but I have gone through piles of English, American, German, and French journals, and have found no original reference to these or any other similar cases. Is there any danger of suppuration? In one of my cases, about ten days after the injection, a small abscess formed near the inner angle of the orbit; and, in two cases, the line of the needle broke down: these three cases were done with Eckstein's paraffin, and the blame is to be laid, I feel sure, partly on it. To the same cause I attribute also some discoloration of the skin, which occurred in some of my earlier cases.

Is there any danger of embolism? Two cases of embolism have occurred after the injection of paraffin into the loose vascular submucous tissue of a prolapse. But I can find only one case of embolism after injection under the skin of the nose: in this case, "amaurosis" of one eye followed the injection: doubtless a vein was wounded: I cannot discover the original reference, or find out whether the amaurosis was temporary or permanent.

Here are twenty-nine cases, without death or disaster, and the general results are very good. They are not perfect; indeed, some of them are far from perfect: the surgeon cannot model a Greek nose out of nothing. He can always discover some fault in every operation that he does: and these paraffin-noses are no exception to that wholesome rule of all surgery. But the method is none the less a most admirable invention; and its success, in many cases, is nothing short of wonderful.

I have published a number of photographs in the *British Medical Journal* of January 3, 1903, and the few more that I publish here are intended, not to commend the method, for it needs no commendation, but to illustrate some practical

PLATE XIX.

Fig. 3. *Before treatment.*

Fig. 4. *After treatment.*

*Case of Tertiary Syphilis with large perforation involving cartilaginous septum.*

matters. It comes to this, that there are some noses which cannot anyhow be made handsome: they may be coarse, clumsy, and thick-skinned at their tips; or they may be contracted upward and puckered by syphilitic necrosis, with elongation of the upper lip; or the flattened-out nasal bones may make ugly folds of skin under the eyes; or the face may be so short and square that a Greek nose, if it were possible to make one, would look out of proportion to it. But, even in very bad cases, a great deal of good can be done thus:—

1. The upper part of the nose, between the eyes, can be raised and fashioned into a fair shape, in almost every case. This is an immense gain, it alters the whole look of the full-face, giving a proper setting to the eyes, and improving the expression of intelligence and of will.
2. The nose can be slightly increased in length.
3. The profile-line can be, more or less perfectly, straightened; but the surgeon must not expect to make noses like that of the Venus of Milo. He will always, I think, be wise to be content with less than this.
4. The tip of the nose can be slightly depressed, so that the nostrils look directly, or almost directly, downward.
5. In two of my cases, the patient, without being asked, said that he breathed more freely through his nose after the treatment.

These results may be obtained by skilled hands in nine cases out of ten; but they are not likely to be obtained without some "touching-up." The surgeon must not expect to work miracles. Happily, these patients do not want them; what they do want, is something very different. These cases of sunken nose are more tragedy than farce; the men cannot get wives, and the girls cannot get husbands. They are, all of them, hindered from getting work; and they are stared at, or chaffed, till their lives are a burden to them; and, wherever they go, they are suspected of syphilis. It needs no imagination to see, in photographs taken before and after treatment, not only better-shaped noses, but also a change

from a depressed, hang-dog look to a certain cheerfulness and self-respect.

Of course there are little difficulties and perplexities, which need experience to overcome them: it is not so easy as it looks on paper. The prudent surgeon will not expect to do more than make his patient unnoticeable. The best cases are those in which there is plenty of lax healthy skin, a fair length of space between the forehead and the upper lip, and a fairly refined end to the nose. The less favourable cases are those in which there is wide and evident splaying-out of the nasal arch, like buttresses, or a very short space between the forehead and the upper lip, or a coarse and negro-like end to the nose. The worst cases of all are those in which the nose is puckered and crumpled by syphilitic necrosis, with dense cicatricial tissue, and everything is shrunken and rigid.

I am deeply indebted to Mr. Aubrey Pollock and to Mr. Spiers, my house-surgeons, and to Dr. Shuter and Mr. H. P. Noble, for their assistance in these cases.

# COLOUR-BLINDNESS IN THE MERCANTILE MARINE.

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The question of colour-blindness in the mercantile marine naturally at this stage of development resolves itself into a two-fold aspect—the efficiency of the test applied to detect this visual deficiency, and the restriction or otherwise of its application.

Prior to 1877, there was no test whatever, although the safe conduct of merchant shipping had long ago necessitated the employment of coloured signal-lights. Then in the year named there was introduced a system of testing by asking candidates to name the colours of exhibited cards, glasses and coloured lights; but the candidate who failed to pass the test was not debarred from obtaining a certificate entitling him to act as master or officer. All that was done was to endorse that certificate "failed in colours," an endorsement which the shipowner who engaged him might not see — if he were merely content with the assurance that the man had a master's or a mate's certificate, as the case might be — or might not trouble about, if he did see it; for it has been demonstrated over and over again, in the history of the "colour-blind" question, that there has always been a tendency on the part of some shipowners to regard the institution of any test designed for the elimination of "colour-blinds" from the merchant service, as a medical fad, calculated to restrict artificially the supply of labour for service on ship-board. The cry "Leave us alone to conduct our business without further Board-of-Trade interference" has been frequently raised, with the result that the Board of Trade have been stiffened in the attitude of stolid conservatism which they have adopted upon the matter. The Holmgren wool-test, which came into use in September 1894, is not, as I shall show later, the absolutely infallible test in the hands of lay examiners that one would like to see it; and I should like to pay a compliment to the Board of Trade examining staff at Liverpool, for the efficient and generally

intelligent manner in which the test has been administered by them. The number of candidates examined at Liverpool for masters' and mates' certificates is second only to that of London; yet since 1894, when the test was instituted, I can only find two instances in which the diagnosis of the Liverpool examiners has been upset on appeal: it is a pity that the same cannot be said of other local centres. Without going into the vexed question of the thorough and sufficient character of the Holmgren wool-test, of its failure to detect certain phases of colour-blindness, of the divergent theories as to colour-perception, I would emphasise the fact that the importance of eliminating colour-blind men from the navigational section of the *personnel* of the merchant service is greater than ever. Vessels of a speed of 15 knots and upwards are tolerably common, and the size and consequent cost of these steamers have also increased, so that a disastrous collision means greater ruin than was formerly the case. When two steamers of this speed are approaching each other, the distance of two miles, at which the sidelights of each would be distinctly visible to the other, would be bridged in less than four minutes; so that the colours of the exhibited lights must be correctly and instantly read, and the rule of the road at sea applicable to the case must be immediately applied, or disaster may follow. But there are faster steamers than those of 15 knots, and these may, through the colour-blindness of officer or man on the veriest tramp that ever sailed the seas, be involved in a disastrous collision. The truth of this statement is now generally recognised, though it will hardly be believed that for years the contention of the Board of Trade and the Press who supported their policy, was—"Produce cases in which casualty and loss of life has resulted, and we will then think about eliminating the colour-blind from the ranks of seamen and officers." The inhumanity and unwisdom of such contention I need not controvert. Prevention is better than cure; and the Board of Trade must have known all about the disasters actually produced by colour-blind or otherwise defective-sighted sailors, to say nothing of hundreds of cases in which the probable colour-blindness on the part of sailor or officer was the elucidation of an otherwise insoluble mystery. I do not propose

to discuss the question of whether the Holmgren wool-test detects all the colour-blind persons who are subjected to it, but I wish to direct attention to the gross injustice which is perpetrated at present by the examination as conducted and appealed from. The following tables show the number of candidates tested during the periods 1877–1894, and 1894 to the close of last year. The candidates are either those who present themselves for the voluntary test—boys contemplating a sea career, sailors whose employers wish to assure themselves of their reliable visual powers, &c.—and candidates for masters' and mates' certificates, in whose cases the examination for form- and colour-vision is compulsory.

On November 1, 1900, a new departure was inaugurated. Prior to that date men employed on fishing vessels were not required to pass the tests for form- or colour-vision. Of late years, however, steam trawlers have greatly increased in numbers. Many of these craft are powerful vessels carrying as many as twelve hands and making long voyages in the prosecution of their business. The coast of Iceland, the Bay of Biscay, and points to the westward of Ireland are some of the favourite trawling-grounds, while the North Sea and the English and Irish Channels are regularly dotted with these ubiquitous craft. Very wisely, therefore, the Board of Trade deemed it advisable, in the interests of the safety of life and property at sea, to insist that fishermen, when presenting themselves for examination for certificates as masters or second hands of fishing boats, should be required to pass the same sight-tests as candidates for certificates of competency as masters or mates in the Mercantile Marine.

| Year. | No. of Candidates examined in *Form*-Vision. | No. of Failures. | Percentage of Failures. |
|---|---|---|---|
| Sept., 1894, to Dec., 1895 ... | 6,783 | 103 | 1·51 |
| 1896 ... ... ... ... | 5,051 | 34 | ·67 |
| 1897 ... ... ... ... | 5,977 | 34 | ·57 |
| 1898 ... ... ... ... | 4,103 | 23 | ·56 |
| 1899 ... ... ... ... | 4,642 | 21 | ·45 |
| 1900 ... ... ... ... | 4,318 | 18 | ·42 |
| 1901 ... ... ... ... | 4,901 | 23 | ·47 |

COLOUR-VISION.

| Year. | No. of Candidates examined in *Colour*-Vision. | No. of Failures. | Percentage of Failures. |
|---|---|---|---|
| 1877–9 ... ... ... ... | 5,967 | 26 | ·43 |
| 1879-80 ... ... ... ... | 4,344 | 16 | ·36 |
| 1880-81 ... ... ... ... | 4,501 | 21 | ·46 |
| 1881–2. ... ... ... ... | 4,138 | 27 | ·65 |
| 1882–3 ... ... ... ... | 4 078 | 32 | ·78 |
| 1883–4 ... ... ... ... | 4,659 | 27 | ·57 |
| 1884–5 ... ... ... ... | 4,460 | 31 | ·69 |
| 1885–6 ... ... ... ... | 4,509 | 63 | 1·39 |
| 1886–7 ... ... ... ... | 4,539 | 51 | 1·12 |
| 1887–8 ... ... ... ... | 4,965 | 50 | 1·01 |
| 1888–9 ... ... ... ... | 5,232 | 54 | 1·03 |
| 1889-90 ... ... ... ... | 5,501 | 52 | ·94 |
| 1890–1 ... ... ... ... | 5,289 | 63 | 1·19 |
| 1891–2 ... ... ... ... | 5,219 | 43 | ·82 |
| 1892-3 ... ... ... ... | 5,200 | 61 | 1·17 |
| June, 1893, to Aug., 1894 ... | 6,663 | 85 | 1·27 |
| Sept., 1894, to Dec., 1895 ... | 6,680 | 93 | 1·39 |
| 1896 ... ... ... ... | 5,017 | 51 | 1·02 |
| 1897 ... ... ... ... | 5,943 | 40 | ·67 |
| 1898 ... ... ... ... | 4,080 | 33 | ·81 |
| 1899 ... ... ... ... | 4,621 | 39 | ·84 |
| 1900 ... ... ... ... | 4,300 | 31 | ·72 |
| 1901 ... ... ... ... | 4,878 | 46 | ·94 |

The failures it should be noted are the net failures, and do not include those candidates who failed before the local examiners, but subsequently passed on appeal. During the year 1901 there were four such cases, particulars of which I give at length.

H. D. G., aged 22. Candidate for a second-mate's certificate, failed to pass the colour-vision test at London on May 3, 1901. He appealed and passed on May 10, 1901.

J. P., aged 25. Candidate for first-mate's certificate, failed in the colour-vision test at London on September 13, 1901. He appealed and passed on September 26, 1901.

J. G. D., aged 16. Failed in the colour-vision test at

London on November 29, 1901. He appealed and passed on December 11, 1901.

J. R. L. Candidate for second-mate's certificate. Failed at London to pass the colour-vision test. He appealed and passed on December 11, 1901.

The fact of these four candidates rejected by the local London examiners as being possessed of an imperfect colour-perception, and yet being declared of normal colour-vision by the central authorities within a week or a fortnight, calls for some explanation. It is incredible that these men should be colour-blind one week and possessed of normal vision for colours the next. In the report on sight-tests in the mercantile marine, from which I have extracted these cases, there is no explanation of the anomaly. A charitable view to suggest—charitable because kind to Board-of-Trade examiners—is that these rejected and passed candidates were victims of tobacco amblyopia, *i.e.*, that their colour-blindness was acquired and curable, and that it did in fact cure itself to the point of disappearance during the short period which elapsed between the date of their rejection and their subsequent passing. This explanation however, will be vetoed as far-fetched; and the average student of the subject will prefer to think either that something was wrong with the conditions under which the test was administered (*i.e.*, the wools were faded or dirty, or were exhibited in a bad light), or that in some other way the trial was unscientifically conducted. It is, of course, gratifying to think that justice was done, and that these candidates who might have been the victims of a serious injustice, "passed the colour-test," but at the same time the moral effect of such failings and passings is bad. Candidates become imbued with the notion that the test is no real test, but a sort of arbitrary judgment of the examiners. Look at the matter from another point of view; 14 of the rejected candidates appealed, and four of the number passed on appeal. The number of candidates who did not apply for re-examination was thus 32, and assuming e same proportion to be of normal vision as among the 14 appellants, then at least nine candidates were rejected as colour-blind who were possessed of normal colour-perception. This is a very disquieting reflection, to say the least.

Now, what are the causes which operate to determine

whether or not a man, who is returned as failed to pass the tests for colour-vision, appeals to head-quarters and demands a re-examination? I am convinced that the chief factor is expense. I know a leading steamship line which pays its third officers at the rate of 6*l.* per month, and included among them are many men who hold masters' certificates. It is obvious, therefore, that the average candidate who presents himself for a first or second mate's certificate, and as such is examined for colour-vision, cannot be troubled with a superfluity of cash. Further than this, it should be remembered that the *modus operandi* of the would-be officer is to "go to school" for a period of weeks or months to be coached or crammed up for his ordeal before the examiners. His "schoolmaster" must be paid in advance; and then when he feels himself sufficiently primed to face the examiners, he has examination-fees to pay, added to which he has incurred the expense of board and lodging during his attendance at school. Thus in the majority of cases the candidate who is rejected by the local examiners as colour-blind has reached the end of his finances, and instead of appealing against what may be a mistaken verdict, he thinks only of getting to sea—in no matter what capacity—to replenish his now empty pockets. Thus I feel convinced that it is poverty which curtails the number of these appeals; and such being the case, it would only be just and humane on part of the Board of Trade did they ensure either that the local test was absolutely above suspicion, or that rejected candidates had the right of free appeal. Of course it will be argued that, did the Board of Trade pay the expenses of appellants, every rejected candidate would be examined by the central authority; but this would be better than that injustice should be done, and that men possessed of a normal colour-sense should be, through the incompetence of local examiners, declared colour-blind, and should through lack of means have to accept such a decision as final. That injustice is done and hardship inflicted by the existing arrangements is more than probable, it is certain.

I have already pointed out that during the year 1901, of 14 candidates who appealed from the decision of the local examiners four were successful. In 1896 six appealed, and one passed, and in the previous year out of 9 appeals only one was successful. But in 1896 five passed out of 12 who appealed,

while during the previous 16 months there were 21 appeals, of whom eight passed. A proportion which was still higher, five out of 10, occurred during the year ending December 31, 1900. If these figures have any moral at all, it is that they prove to the hilt the case for the examination in form- and colour-vision being conducted by competent experts. The Holmgren wool-test has certainly simplicity to recommend it, but its very simplicity is an objectionable feature, for it borders on the empirical. The lay examiner is called upon to pronounce whether the candidate whom he tests is possessed of a normal vision for colours, regardless altogether of the fact that there is induced as well as congenital colour-blindness, and that there are degrees of the defect. Captain Abney, a keen and intelligent student of the subject, says, regarding acquired colour-blindness: "It should be the care of all who have the management of railways or shipping to take measures for preventing persons suffering from this disease from occupying posts which require perfect colour-vision in order to prevent the possibility of loss of life." These facts the Board of Trade would do well to recognise. They have been pressed upon their principal officials times without end, and judging by past experience these representations will have to be reiterated for some considerable time yet before the element of uncertainty and injustice will be removed from the tests.

The tests to which I have alluded are all applicable to candidates for masters' and officers' certificates: for the sailor there is no test whatever. It is true that he can, if he thinks fit, have his form- and colour-vision tested by the local Board-of-Trade examiner on payment of a shilling fee, but Jack is not the sort of man to worry over such matters unless compelled; and this voluntary test remains a dead letter except in the case of those owners—and they are comparatively few—who insist that their sailors, or at least their leading sailors, shall have normal vision for form and colour. In the rank and file of British merchant vessels the seamen can be all but blind, and quite incompetent to discriminate between red and green; yet these untested sailors are employed as look-outs, and are also entrusted with the helm, in which position of trust they are often called upon to act upon their own responsibility. It is no reply to my contention that "A.B.'s" should be tested for

form- and colour-vision, that those who serve on some of the fast mail lines are so tested, and that it does not matter for men employed on small craft. The small vessel navigating the seas with a colour-blind look-out is a standing menace to every vessel which she may encounter; and the sooner the Board of Trade realise this and adopt preventive measures, the better will it be for the voyaging community. The policy of the Board, however, has been one of persistent inertia. They first of all required to be convinced of the necessity of any test at all, and then, in 1877, they adopted that under which candidates were required to name the colours of exhibited glasses and lights. This was most illogical; in fact, the "naming" test was neither more nor less than a guessing competition, under which the colour-blind could guess correctly, and men with a normal colour-perception might be rejected because they were ignorant of colour-nomenclature. After years of patient work, of papers read, of deputations to successive Presidents of the Board of Trade, and of enlistment of the valuable aid of the public press, the conservatism of the Board began to be shaken, and a Committee of the Royal Society was appointed to report upon the whole subject. As a result of the labours of that committee we have the present Holmgren wool-test instituted, side by side with the regulation that a man may not go on with his navigational examination if he fails to pass the colour-vision test. But the Board of Trade also saw in the report of the Royal Society a conviction of their past apathy and failure to grasp the vital issues of a subject which intimately concerned them as custodians of the travelling public. One of the recommendations of the Royal Society ran as follows: "That in case of judicial inquiries as to collisions or accidents, witnesses giving evidence as to the nature or position of coloured signals or lights should be themselves tested for colour- or form-vision." The common sense of this suggestion is patent even to the man in the street, yet I know of no case in which this recommendation has been acted upon; and the perusal of the records of the Admiralty Court and of Board-of-Trade investigations into collision cases show that the conflict of evidence in such cases is simply sickening. There may be in many instances hard swearing on both sides, but I feel convinced that much of the discrepancy of evidence would disappear were the witnesses tested for colours,

for I firmly believe that many of these witnesses speak the truth when they say they saw a red or a green light. They saw what they thought was red or green, but being colour-blind they wrongly described it—perhaps acted wrongly in consequence of their erroneous impression, and so contributed to disaster. Why, then, do not the Board of Trade or some other tribunal act upon the above recommendation? If they did, the public would be supplied with the solution of many a maritime casualty; and the same watchfulness which prevents a colour-blind man from holding rank as captain or officer would prevent him from officiating as look-out, or filling any other responsible position in which his visual infirmity might bring about serious casualty and loss of life.

## A CASE WITH COMMENTS.

### ADHESIVE MEDIASTINO-PERICARDITIS.

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[With Plate XX.]

The fact that adhesive pericarditis, attended by mediastinal complications, is comparatively rare, renders every additional instance of the affection a matter of importance as increasing the general store of information. Every new symptom which is described is also of value as aiding the future elucidation of the disease. In spite of the labours of numerous observers, the diagnosis of such conditions still remains somewhat uncertain, and every additional fact is useful as a contribution to methods of recognition. The aim of the present paper is to furnish a description of a most interesting case suggestive of adhesions connected with the pericardium and mediastinum, to analyse the symptoms presented by the patient as succinctly as possible, and to arrive at a provisional diagnosis. It is unnecessary to enter upon any account of the literature of the subject as the exhaustive work of Harris[1] contains a full summary of all the important observations on the subject; it may, therefore, be confidently recommended to anyone desirous of studying the work that has already been done.

P. F., aged 16, a pit-head labourer, was admitted September 6, 1902, to Ward 29, complaining of shortness of breath, with swelling of the feet, legs, abdomen, and face.

*Previous History.*—His father and mother, aged 72 and 54 respectively, are both alive and well. He has six brothers and two sisters, who are all healthy. There have been no deaths in the family. His appetite normally is good; he does not take alcohol or use tobacco. The home surroundings are comfortable. His work is hard, and consists in pushing weighty trucks; the hours, however, are not very long. He had typhoid fever five years ago.

[1] *Indurative Mediastino-Pericarditis.* London, 1895, p. 65.

*Present Illness.*—Last January the patient was troubled with shortness of breath. Six months later he suffered from swelling of the feet and legs on returning from work, which partially subsided during the night; also from swelling of the abdomen, without subsidence in the intervals of rest; and œdema of the face about the eyes on waking in the morning. These symptoms became increasingly inconvenient until his admission to Ward 29. The patient also noticed, prior to admission, a feeling of fulness in the region of the stomach after meals, and observed that he was passing urine of an abnormally dark colour.

*General Facts.*—The face is markedly cyanotic. The bridge of the nose is broad, and the nostrils slightly dilated. The general appearance is that of a strong, healthy, well-developed boy, 5 feet 1½ inches in height, and 8 stone 4 lbs. in weight. There is no anxious expression, and the attitude is easy. The breathing is shallow and frequent. The abdomen is much enlarged, and there is considerable anasarca of the lower and dependent parts of the body, as well as of the tissues around the eyes. The temperature is slightly subnormal.

*Circulatory System.*—There is no pain, palpitation, or faintness, but dyspnœa is constant. The veins of the neck are slightly distended, but show no abnormal pulsation. The præcordia are well formed, with no undue prominence, and there is no indrawing with the impulse. The apex-beat is in the fifth interspace, slightly internal to the mammary line, and is not pronounced. The right border of the heart is 1½ inches, and the left 4 inches, from mid-sternum. The sounds of the heart are in every respect normal, there not being even a

Fig. 1. *Tracing of Breathing and Pulse in the case of P. F. The upper line is that of the chronograph; the second that of the stethograph; the lowest that of the sphygmograph.*

slight accentuation of any one of them. The arteries are all somewhat inadequately filled, and the pressure of the blood is below the average. The pulse is regular in time, but unequal in force; the finger is able to appreciate the fact that with deep inspiration the size of the pulse-wave becomes smaller. Sphygmographic tracings reveal the characters of the "paradoxical pulse." Two of these, for help in obtaining which we are indebted to Dr. Oliphant Nicholson, are reproduced in the accompanying illustrations. They show the respiratory curve as well as the sphygmographic tracing.

Fig. 2. *The explanation of Fig. 1 is applicable to this figure, but the time-marker was not employed in it. In both tracings it will be seen that the pulse tracing becomes smaller immediately after the inspiratory rise of the respiratory curve.*

*Respiratory System.*—The rate of breathing is 30. The rhythm is regular, and the type costo-abdominal. The chest is well formed, and the expansion equal on both sides, but there is well-marked indrawing of the intercostal spaces, especially on the right side, during inspiration. The circumference of the chest just below the nipple is 31½ inches. The vocal fremitus is distinct and equal on both sides. Anteriorly the percussion-sounds correspond on both sides; they are clear, and no areas of dulness can be made out. Posteriorly there is dulness at the bases of the lungs on both sides; there is also dulness in the axillary line on the right side. Anteriorly, in the right supra- and infra-clavicular regions, the breath-sounds are of harsh vesicular type, except in the angle between the sternum and clavicle, where it is broncho-vesicular. Posteriorly the sounds are bronchial on both sides, in the interscapular areas, but more so on the right. Elsewhere they are vesicular, and at the bases they are very faint. No adventitious sounds are present. There is no change in the vocal resonance, save slight exaggeration between the scapulæ, and diminution at the bases.

PLATE XX.

Fig. 3. *Outlines of the dulness of the heart and liver, and of the spleen in the case of P. F.*

*Hæmopoietic System.*—There is great enlargement of the spleen, which reaches to a point 3 inches below the costal margin in the anterior axillary line. No enlargement of the thyroid or lymphatic glands is present. The condition of the blood is full of interest. As might be expected from the cyanotic aspect of the patient, there is a considerable increase in the hæmoglobin and erythrocytes. The facts are as follows :—

| | |
|---|---|
| Hæmoglobin - - | 80 per cent. |
| Erythrocytes - - | 8,000,000 per cubic mm. |
| Leucocytes - - | 7,500 per cubic mm. |

A careful examination of blood-films shows that there is no change in the red blood-corpuscles, save an increase in number, and diminution in size, while the relative proportion of the different white blood-corpuscles is perfectly normal. Since the case was taken the hæmoglobin and hæmocytes first increased to a greater degree and then suddenly fell to below normal. Later they again increased, and afterwards again sank to about the normal figure.

*Alimentary System.*—The lips are somewhat blue; the teeth are good, and the gums in a healthy condition. The tongue is furred. The palate is arched and high. The appetite is good; there is no discomfort after meals, and the patient drinks moderately. The abdomen is distended. The liver-dulness begins at the fourth cartilage; the lower margin of the organ can be felt in the mammary line 1 inch above the level of the umbilicus, and in vertical extent it measures 9 inches. The spleen can be felt deeply below the last rib. The areas of cardiac, hepatic, and splenic dulness may be seen in Fig. 3 (Plate XX).

*Urinary System.*—The urine is scanty, amounting to 20 ounces. It is dark-coloured, with a s.g. of 1025, and is frankly acid. It contains a small amount of albumen.

It may be added that the case has been recently utilised[1] for the purpose of ascertaining whether in profound cyanosis the increase in the hæmocytes and hæmoglobin is uniform throughout the different parts of the circulatory system, with the interesting results that the arteries are found to contain fewer hæmocytes and less hæmoglobin than the capillaries, while the veins have more than either.

[1] *The Lancet*, 1903, Vol. I., p. 155.

This case can only be explained on the basis of some interference with the return of blood to the heart from the great venous channels; and as no valvular lesion could be detected, while at the same time no apparent cause of myocardial weakness was present, it seemed most likely to be of pericardial origin—probably tubercular in its nature. It must be admitted that the clinical picture lacks some of the usual details. The ordinary phenomena in the veins of the neck, such as the inspiratory distension, are not represented in this case, but the enlargement of the liver and spleen which the patient showed are most characteristic of mediastinal and pericardial adhesions. Among the twenty-five cases collected by Harris,[1] seventeen had enlargement of the liver, and one, without enlargement, presented thickening of the capsule. In the remaining seven cases there was either no enlargement, or the condition is not mentioned. As regards the spleen, in seven of the same twenty-five cases the spleen was enlarged, and in four, although not enlarged, there was great thickening of the capsule. The presence of the paradoxical pulse is in favour of the diagnosis of a mediastinal and pericardial origin of the case. This condition of the pulse is not, however, to be regarded as in any sense pathognomonic. It has been seen in a considerable number of other chest-affections besides mediastino-pericarditis, and it has also been found in apparent health. Yet its presence will always attract the attention of the physician to the pericardium, which should be very carefully examined. In combination with the other symptoms in this case it has led us to the diagnosis of mediastino-pericarditis, probably of tubercular origin.

One word in conclusion. It is rather difficult to explain why the pulsus paradoxus should make its appearance in cases with no adhesions which could drag upon the vessels at the base of the heart during inspiration. It may, however, be explained by the supposition that in conditions where the heart is weak, the inspiratory efforts will pull upon the heart from every side, and diminish its systolic contraction. In the case of a strong heart such agencies will have but little influence, but when the heart is somewhat weak, or when the lungs are not so distensible as in health, some effect upon the heart, such as has been suggested, may be found.

[1] Op. cit., p. 42.

# SOME RECENT WORK ON THE ÆTIOLOGY AND TREATMENT OF ECLAMPSIA.

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ECLAMPSIA has formed the subject of a number of recent experiments and observations, which taken together are of great importance. The symptoms and signs of eclampsia, its diagnosis and prognosis, are all too well known. Every experienced practitioner has in his mind's eye certain clinical pictures which represent to him the disease in its various forms. These pictures are so painful and so impressive that it is needless to recall them here. But as to the causation of eclampsia and its treatment things are very different.

It is doubtless held by many so-called practical men that to discuss a subject like the causation of eclampsia is mere waste of time. The readers of even the more recent text-books may well be driven to this conclusion. But so long as a man has in his mind no definite theory as to the cause of a condition, so long will his treatment of that condition be merely empirical. Further, empirical treatment is never uniformly successful. Both these points are amply proved by the history of medicine. To become universal, a line of treatment must be rational; that is, it must be based upon some theory. The absence of an accepted theory of the causation of eclampsia thus accounts for the diversity of methods used in its treatment.

It may be asked, "Is not a good empirical method of treatment better than a bad rational method?" "Certainly," is the answer, "if it happens to be used in a suitable case." But this is what the empiricist can never secure. The difference between empiricism and rationalism is the difference between quackery and medicine. The evolution of the theory of eclampsia must therefore be regarded as equally important with the development of treatment. An additional point in favour of recent theorisings on this topic is the fact that they have led to attempts at the early diagnosis of the pre-eclamptic state,

and the prevention of eclampsia. These attempts to foretell and forestall the condition have been justified by brilliantly successful results in the hands of a great number of practitioners. Let us, therefore, consider first modern theories, and next modern treatment of eclampsia.

To begin with, everyone seems at last to have given up the idea that eclampsia is a renal disease. It is generally allowed that the condition is due to the circulation in the blood-stream of a poison or poisons of which the exact nature is unknown. These poisons are supposed to enter the blood in one or both of two ways: either they may be absorbed from the alimentary canal of the patient, or they may be due to the chemical changes in her tissues, collectively known as metabolism. It is held that the pregnant woman is specially liable to intoxication, because her organism has to deal not only with the waste products of her own tissue-changes, but also with those due to the metabolism of the fœtus. Poisons passed into the blood from the tissues or absorbed into it from the alimentary canal are, in health, dealt with by various "organs of defence," being either changed into innocuous substances or at once expelled from the body. The liver, the kidneys, the thyroid and other glands are the principal organs of defence. A breakdown on the part of any one of these will throw the whole mechanism out of gear. Suppose, for instance, that the liver fails to deal completely with a toxine absorbed into the blood from the alimentary canal. The poison remains in the blood and passes through the kidneys. These excrete it for a time, it may be, and then themselves become irritated and injured, so that they fail in their own functions. The result of this breakdown in the renal function, secondary to a primary failure of the liver, is to leave the poisonous substances circulating in the blood, together with a certain amount of urea which the injured kidneys fail to excrete. The next phase in the sequence of events is the appearance of albumen in the urine. Then, if the condition be not relieved by the end of pregnancy, or by appropriate treatment, serious results may follow, one of which is eclampsia. In the majority of women the defensive organs remain adequate throughout pregnancy. In a considerable number there is some disturbance of function during

the early months; but as the organism adjusts itself to the demands of reproductive life, the symptoms of intoxication pass off. In the few a vicious circle is established, intoxication becomes more and more pronounced, and either eclampsia or some other serious manifestation occurs. Further, in a large proportion of those women who recover from eclampsia during their first pregnancy, the defensive organs act perfectly well in subsequent pregnancies. In a few, however, toxæmia occurs with increasing severity in successive pregnancies, until, by repeated periods of irritation, the kidneys are permanently injured, and chronic renal disease ultimately claims the victim.

It is perhaps not correct to say that the theory of eclampsia thus outlined is an accepted view. A great number of writers, teachers, and practitioners have, however, been using the conception as a working hypothesis. As a theory it appears to fit the clinical facts which have to be explained more closely than previous views. In teaching, the most valuable theories are those which connect a number of facts in an easily-remembered series; and the so-called toxæmia of pregnancy is certainly a string on which most of the disorders of pregnancy can be strung like so many beads. In practice this same theory has, without doubt, contributed greatly to the early diagnosis and management of the pre-eclamptic state; in other words to the prevention of eclampsia. Workers in the laboratory have not, however, been able to give any conclusive experimental proofs of the correctness of the view, which must still be regarded as a mere working hypothesis. The reader is referred to Dr. Eden's critical review of the literature of the subject which appeared in the *Journal of Obstetrics and Gynæcology of the British Empire* in February, 1902.

There have been in the past various attempts to show that the poison which produces the symptoms of eclampsia is produced by microörganisms. This view has again been revived in a form differing somewhat from those which it has previously assumed. Thus Müller argues (*Archiv für Gyn.*, 1902, Bd. lxvi., Heft 2) that eclampsia is a general intoxication, the source of the poison being the life of bacteria within the uterus. The disease only occurs in pregnant, parturient, and puerperal women; therefore, he

argues, the poison must be uterine in origin. The condition may appear several days after labour; therefore the placenta and fœtus cannot be regarded as possible sources of intoxication. For this author the three salient features in eclampsia are — (1) the nervous disturbances, (2) the injury to the kidneys, and (3) the fever. These he considers as being the leading features of puerperal fever also, and he draws a parallel between the two conditions. Both, he says, are general intoxications; both may occur before, during, or after labour. The poison is in each the result of bacterial life within the uterus. The occurrence of convulsions is regarded as due to the sudden absorption into the blood of large doses of poison, the continuous absorption of smaller doses causing the symptoms of puerperal fever with its minor nervous disturbances, delirium and ultimate coma. Upon this theory convulsions occurring after labour are more easily explained than those beginning during or before labour. The author, therefore, discusses the puerperal condition first, and passes on to say that the eclampsia of pregnancy is essentially the same. The bacteria concerned are supposed to lie in the uterine cavity before pregnancy begins, and to remain latent in the endometrium during the early months of gestation, returning to a life of activity and poison-production when pregnancy is far advanced. Toxines of high virulence are then produced, and when they are rapidly poured into the circulation, eclampsia follows.

Albert [1] has written several papers advancing the same views as those held by Müller; indeed he insinuates that this writer borrowed his ideas without troubling to say whence he got them. One of Albert's papers was entitled, "Latent Microbic Endometritis during Pregnancy." In this he suggested that in many abortions and premature labours, especially those which run a septic course, the cause of the condition is the presence in the decidua of latent microörganisms, whose activity is renewed during pregnancy or just before labour. Upon this basis he develops the view that eclampsia is a variety of latent microbic endometritis. The uterine cavity, he points out, is well drained except during pregnancy. It is then closed, and products of bacterial life are pent up within

[1] Albert, *Archiv für Gyn.*, Bd. lxvi., Heft 2, 1902.

it. The poisons so produced and accumulated escape into the circulation, and have to be dealt with by the defensive organs of the body, especially by the liver and the kidneys. These organs are injured by the passing poisons, and variations in the lesions produced correspond with the different clinical types of septic fever and eclampsia. In these cases, he says, it is often possible to obtain a history of leucorrhœa, dysmenorrhœa, and other symptoms of septic endometritis existing before pregnancy. He narrates two cases of women who died undelivered in eclampsia. In both of these post-mortem examination revealed bacterial infection of the decidua. No particular organism is named as the cause of the condition. In this particular the views of Albert and Müller differ from previous bacterial theories of eclampsia, for these took for granted that some special organism was to blame. The authors of these papers bring practically no evidence in support of their contention. As cases in which Cæsarean section is performed, and those in which patients die undelivered, are the only ones available for bacteriological examination, much time must elapse before proof or disproof can be supplied.

More interesting, and perhaps more capable of justification, is the theory advanced in several papers by H. Oliphant Nicholson,[1] who believes that the principal symptoms of the eclamptic state can be explained in terms of thyroid inadequacy. The thyroid gland is enlarged in normal pregnancy; but this enlargement can be diminished or prevented by giving thyroid extract. A larger supply of iodothyrin is needed in the pregnant than in the non-pregnant state. Lange observed that albuminuria and eclampsia occurred in 20 out of 25 cases in which the usual thyroid hypertrophy of pregnancy did not occur.

"It is generally agreed that the eclamptic symptoms are dependent upon an auto-intoxication, and it seems quite likely that this condition is a result, in the first instance, of inefficient metabolism, and subsequently of imperfect excretion. The whole question of auto-intoxication is intimately associated with the adequate function of the various metabolic organs of the body — the so-called 'defence organs' — and it may be assumed that iodothyrin is essential to the efficient working

[1] Nicholson, *Journal of Obstetrics and Gynæcology of the British Empire*, July, 1902.

of all the parts of the defensive mechanism." Iodothyrin favours metabolism and increases the excretion of urea. In eclampsia this is strikingly diminished. Owing to a deficiency of iodothyrin, it is thought, the metabolism of nitrogenous substances stops short of the formation of urea, and stops at a point when the products are highly toxic. The clinical features of a typical attack of eclampsia resemble those of complete athyroidea, as caused by the removal of the thyroid gland in animals. Eclampsia may thus be regarded as a temporary athyroidea. The resulting toxæmia may be slight or severe, short or prolonged. While the athyroidea lasts, the liver and other organs cannot make urea for the kidneys to excrete, but instead nitrogenous substances are only turned into toxines which injure the kidney, and cause various other lesions and symptoms.

When a woman in the pre-eclamptic state is put to bed and fed on milk, her demands for thyroid secretion are lessened, and nitrogenous metabolism may become complete again. Meat-diet on the one hand, or increased exertion on the other, would again disturb the balance. As Nicholson remarks, many attacks of eclampsia follow the ingestion of a meal of pork or other meat. He might also point out that still more attacks occur during severe muscular exertion, namely, the exertion of parturition. This author lays special stress on the importance of the arrest of the secretion of urine, which, by allowing the absorption of toxines, leads up to and determines the convulsions. Many cases doubtless occur in which the poisons are formed, but in which the kidneys, though injured, remain able to defend the organism from profound intoxication. Now there are several ways in which thyroid inadequacy may affect the renal function. Thus iodothyrin may be regarded as a diuretic. Again, urea, for the formation of which an adequate supply of iodothyrin is necessary, may be regarded as the diuretic *par excellence.* Thirdly, iodothyrin is a powerful vaso-dilatator, and may act on the renal function by maintaining dilatation of the renal blood-vessels. "The thyroid and suprarenal secretions, so far as their action upon the arterial calibre is concerned, are antagonistic, and in all conditions of hypo-thyroidism the arteries are found to be unduly contracted." Spasm of the

renal vessels, brought about by unopposed suprarenal influence, may be *one* of the factors which leads to the arrest of the renal secretion. "It is evident that the real significance of the pre-eclamptic state is that it points to a breakdown of some part of the defensive mechanism. Furthermore, this breakdown is the result of some inadequacy of the thyroid and parathyroid glands, whereby the process of nitrogenous metabolism, instead of resulting in the formation of urea, ceases with the production of intermediate substances which, when absorbed, excite the symptoms of a toxæmia. In this way the degree of toxæmia of pregnancy comes to be dependent, directly or indirectly, upon the quantity and activity of the thyroid secretion; the thyroid gland may therefore be given a primary rôle in the causation of eclampsia." The foregoing reasoning by Nicholson is full of interest and suggestion. The evidence he gives in its favour is mainly therapeutic in character, and will be referred to later.

Hergott[1] has written in a sense similar to Nicholson's under the title "Myxœdema, Parturition, and Eclampsia." He describes a rare observation of parturition in a cretin, aged eighteen years. She looked like a child of eleven years. Hair covered her head, but was absent from the pubes and axillæ. Her skin was rough and dry; the breasts were small, the areolæ were not pigmented, and the linea nigra was hardly perceptible. Mental development was fair, and the case was regarded as one of "atrophic myxœdema." Pregnancy was far advanced when she entered hospital. There had been no vomiting, headache, eye-troubles, or œdema. Labour came on spontaneously. The external genitals and pelvis were very small. Skiagraphic examination showed that the pelvis was infantile in type, and that the ilia, ischia, and pubes were united by cartilage only. On the fourth day labour ended naturally, but before this the patient had had twelve typical eclamptic fits with intervals of an hour between them. Coma during the intervals was not complete. The treatment employed was bleeding, rectal lavage, and the subcutaneous injection of saline solution. During the twenty-four hours following delivery the patient had eight more fits. Recovery was rapid and complete. There was never more than a trace of albumen in the urine. This interesting case is

[1] Hergott, *Annales de Gyn. et d'Obstét.*, 1902, Vol. LVIII. p. 1.

not regarded by the author as one of ordinary eclampsia though the symptoms were typical. The cause of intoxication in this instance he considered to be the myxœdematous condition of the patient. Thyroid inadequacy had prevented her normal development, and the same cause led up to the convulsions which accompanied her parturition. Reverdin called attention to the convulsifying effects of removal of the thyroid. Kocher pointed out that the ablation of the gland produces an intoxication of which one of the results is muscular contractions. As Gley demonstrated, the parathyroid bodies can be distinguished physiologically from the thyroid itself. In man the two are united into a single gland, retaining the distinct functions. Thyroid myxœdema is not complicated by mental apathy; parathyroid myxœdema is marked by arrest of development and cretinoid idiocy. This author describes an observation published in 1897 by Verstraeten and Vanderlinden. The thyroid of a cat was removed in 1892, and the animal became pregnant in 1895. When labour began the cat refused food and became comatose, having also convulsions. After five days an extract of fresh sheep's thyroid was injected into muscle. Improvement set in, the convulsions ceased, labour advanced, and the next day a dead kitten was born. The cat recovered completely. Referring to Nicholson's paper, Hergott does not go so far as to believe that thyroid inadequacy is the cause of all or most cases of eclampsia. He regards the thyroid as one of the defensive organs, like the liver and the kidney. Certain cases of eclampsia can be traced, he thinks, to renal lesions, and others to hepatic insufficiency. If so, why should not the thyroid, and especially the parathyroid, gland be to blame in other cases?

There are many other contributions to the recent literature of eclampsia which, though doubtless models of accurate and enthusiastic research, seem to the British mind rather futile performances. For example, there have been some investigations as to the breaking-off and transportation of placental villi into the maternal circulation. Two authorities, while observing the effects on the blood of introducing placenta into the peritoneal cavities of rabbits, noted that all rabbits so treated become the subjects of albuminuria. They consider that it is therefore desirable that in cases of albuminuria during pregnancy, investigation should be made in order to ascertain

whether deportation of villi into the maternal circulation is taking place. Given a pregnant human female with albumen in her urine, it is difficult, on the spur of the moment, to think of any method by which one could satisfy oneself that bits had broken off from some of the villi of her placenta and, passing along the uterine veins, had entered her blood-stream!

Two other investigators have taken immense pains to show that the nervous system is more than usually irritable, and that convulsions are easily induced during pregnancy. Their method was to trephine guinea-pigs, and apply small quantities of kreatin to the surface of the brain. After endless experiments they conclude that the quantity of this irritant necessary to cause convulsions is smaller in a pregnant than in a non-pregnant animal. Their labours, however, have added nothing to our knowledge of the human female. Clinical observation has long since led us to believe that her nervous system is more irritable during pregnancy than at other times, and our faith will not be aided by the demise of innumerable convulsed and kreatinised guinea-pigs.

It is interesting to find a recent author who still clings to a mechanical theory of the causation of eclampsia. This anachronism is Herzfeld (*Cent. für Gynäk*, No. 40, 1901), who has made eighty-one autopsies on eclamptics in Vienna. All showed changes in the renal system, and in most there were lesions in the liver and spleen. In eighteen cases there was dilatation of both ureters throughout their abdominal course with dilatation of the pelvis of the kidney. This occurred only in primiparæ attacked by convulsions during labour. The condition he ascribes to gradual compression of the ureters by the growing uterus at the point where they cross the pelvic brim. This compression he allows to be impossible if the bifurcation of the common iliac artery into its internal and external branches is normal; but in the cases mentioned the author states that the iliac divided lower or higher than normal, so exposing the ureters to pressure by the uterus. It is not surprising to note that this writer suggests Cæsarean section as the most hopeful treatment for cases of anuria occurring early in the labour of a primipara with presumably dilated ureters!

After having thus attempted to outline some of the more

recent developments in the theory of eclampsia, let us now pass on to the practical aspect of the subject.

First, as to prevention, it is generally recognised that a condition of toxæmia, which may end in eclampsia can be diagnosed long before the occurrence of convulsions. It is also allowed that treatment exerts a favourable influence on this state, and may modify it so as to admit of the termination of pregnancy at term and without disaster. As symptoms which point to the existence of the pre-eclamptic state most authorities recognise many of the minor ailments of pregnancy, such as vomiting, constipation, headache, nervous irritability, disturbances of vision, and abnormal pigmentation. The physical condition accompanying the state appears to consist in constriction of the smaller blood-vessels with resulting rise in arterial blood-pressure. There is diminution in the quantity of urine passed, together with a fall in the percentage of urea.

The appearance of albumen in the urine and the occurrence of œdema are still more definite signs. All agree that these symptoms should receive attention, and that these signs should be looked for in all pregnancies, the urine being examined quantitatively for urea from time to time.

The prophylactic treatment is also generally allowed to be rest in bed, milk-diet, purgation, and the washing out of the lower bowel with copious injections of warm water. It is also allowed that the failure of treatment after a fair trial is the signal for the interruption of pregnancy, whether the fœtus be viable or not. This, however, seems indicated only very rarely, as medical treatment is usually followed by success.

The only important modification of prophylactic treatment suggested in recent papers is that which would follow upon the adoption of Nicholson's views, namely, the administration of some preparation of thyroid gland. This writer says:—"Thyroid extract is of great value as a prophylactic remedy, to readjust the process of metabolism when the first indications of a breakdown appear. One does not wait for albuminuria; if there is a marked diminution in the quantity of urine, œdema, headache, and vomiting, we should immediately put the patient on five grains of the extract twice a day. Rest

and non-nitrogenous diet may also be ordered for a few days until the ominous symptoms subside. In a day or two the secretion of urine becomes greatly increased, and the metabolic processes are again going on efficiently."

In Nicholson's reported cases it must be noted that the symptoms of toxæmia which disappeared under thyroid treatment returned repeatedly when the treatment was stopped, and again vanished when the treatment was recommenced. This raises the records from the rank of mere observations to that of experiments, and shows that these were not cases in which nature unaided could have ende the toxæmic state.

We have mentioned that the induction of labour is recognised as allowable in the prophylaxis of eclampsia, but the question of operative obstetric interference in the presence of convulsions remains in doubt. When convulsions begin after labour the point does not arise. When the attack comes on during labour, dilatation being already considerably advanced, everyone is agreed that obstetric treatment should be continued almost as if there were no eclampsia. Thus labour should be completed only as quickly as is compatible with perfect gentleness. Dilatation may be completed gently with the aid of chloroform-anæsthesia, either with the hand or a mechanical dilator. When dilatation is complete, delivery may be gently completed with the aid of the forceps. The attitude of most authorities indeed is that, in eclampsia beginning during labour, delivery should be assisted only as would be done in the case of any delicate or ailing patient whose state rendered it desirable that her labour should be terminated with the least possible delay and exertion to herself. One exceptional point presents itself; for hæmorrhage in the eclamptic parturient should be favoured and not checked. The omission of the ordinary obstetric measures to limit uterine hæmorrhage forms a convenient way of administering a part of the medical treatment of eclampsia — namely, bleeding.

The really debatable question as to obstetric treatment only arises in those cases in which eclamptic convulsions begin before labour, or when labour has only just begun. Under these circumstances many authorities hold that the

cervix should be dilated or freely incised, and the uterus emptied as quickly as is thought compatible with safety.

Some high authorities have recently been using Bossi's dilator for opening the os uteri, and completing the delivery by forceps or turning. Many patients attacked before labour have doubtless recovered after artificial delivery, but it is impossible to say that they would not have recovered without active obstetric treatment. Many have died after *accouchement forcé* who might, perhaps, have recovered under purely medical treatment. The general trend of feeling, however, seems to be against obstetrical treatment in cases of eclampsia beginning before the onset of labour. The idea is that rapid artificial delivery is a considerable shock to any patient, and that emptying the uterus cannot quickly free the blood from a poison which has been accumulating for months. There is no use in locking the stable-door when the horse is stolen! After convulsions have begun the induction of labour will do more harm than good. In other words, it is only in mild cases that the patient can survive both eclampsia and the shock of rapid artificial delivery.

Before leaving the obstetric treatment of eclampsia, it is necessary to mention that delivery by the Cæsarean section is gaining ground in some quarters. It is clear that this method of delivery is only put forward by those who consider that prompt emptying of the uterus is an essential part of the treatment. The operation, in fact, is suggested merely as an alternative for rapid mechanical dilatation or incision of the cervix and delivery by forceps or turning. It is held by some that Cæsarean section is quicker, involves less shock to the patient, affords a better chance of a living child, and gives no greater risk of subsequent sepsis than does rapid delivery *per vias naturales*. Probably these contentions prove true in the hands of experts, but not under ordinary practitioners, who are often splendid obstetric operators though poor abdominal surgeons.[1] Anyhow, the question is a minor one. Cæsarean section and *accouchement forcé* must stand or fall together, so

[1] In forty-eight cases of Cæsarean section for eclampsia by various experts twenty-six women died, over 54 per cent. This mortality might perhaps have been larger with *accouchement forcé*. It would certainly have been smaller with purely medical treatment.

far as their use in eclampsia is concerned. It must be shown that it is desirable to empty the uterus quickly before it becomes necessary to decide upon the safest way of doing so.

To sum up, there seems to be, according to the views of one party, very little room for obstetric treatment in eclampsia. It is limited to gently accelerating the progress of labour in cases in which it has already begun. As above mentioned, the induction of premature labour remains as a part of the management of the pre-eclamptic state; that is, as a preventive measure, not as a mode of treatment of actual eclampsia. Thus, let us suppose the physician and the obstetrician to be separate individuals. The physician, being in charge during pregnancy, might send for the obstetrician to interrupt gestation, there being no fits and no labour. In the presence of convulsions, he would not send for the obstetrician unless labour should begin. The obstetrician being in charge during labour would send for the physician should convulsions begin, and would do nothing but his ordinary obstetric work in the case.

According to the views of the other party, obstetric treatment is all-important. The uterus must be emptied, and the quicker the better, be it by incision of the cervix, dilatation *à la* Bossi, or Cæsarean section.

It is very difficult to form a correct idea of the medical treatment of eclampsia which is most generally in use at the present time. Certain pronounced changes, however, have occurred during recent years. Thus chloroform is much less freely used than was previously the case. It seems to be employed only during actual convulsions and during the performance of the obstetric operations which may be required. We no longer hear of patients being kept under the influence of chloroform for many hours continuously. Again, croton oil and other purgatives have been dropped in favour of lavage of the rectum and lower bowel; just as the risky pilocarpine has been completely displaced by the useful and perfectly harmless wet pack. Chloral and the bromides also seem to have dropped out of use, since it began to be realised, ten years or more ago, that morphia could safely be used for the control of the convulsions. Bleeding has probably become more common during recent years. The use of Veratrum viride is certainly very popular in America, and the drug has also been tried on

the Continent and to some extent in this country. Its use was at first empirical, and it is still to be noted that the majority of authors who recommend it do not give any explanation of its mode of action. A powerful and somewhat dangerous drug like this is doubtless best avoided, if safe and rational means will secure the same results.

Thus the modern practitioner when face to face with eclampsia will generally begin with a hypodermic of a full grain of morphia, using a little chloroform during convulsions. He will have the bowel well washed out with alum-water or soapsuds; and, if he can obtain the necessary articles, he will roll the patient in a sheet wrung out of hot water, envelop her in waterproof, pack hot-water bottles round her, and cover all with blankets. These simple measures will suffice in slight cases. More morphia may be administered, if required; and, when the patient can swallow, a good dose of calomel will be given. In more severe cases most men at the present time would proceed to bleed the patient or to inject saline solution under the skin. In many cases these measures would be combined. In a recent instance, after 1½ grains of morphia had been injected, over 15 ounces of blood were taken from the arm. Three pints of saline solution was then run into the subcutaneous tissues, and finally another 15 ounces of blood were removed. More morphia was required during the evening, but no obstetric treatment was used. The patient became conscious the next morning. Labour then began, and ended spontaneously, being followed by a normal puerperium.

The most striking feature in the recent history of eclampsia is the rapidity with which the treatment by subcutaneous injection of saline solutions has become general. The credit for this belongs, in great measure, to Jardine of Glasgow. His first paper on the subject was reviewed in this journal shortly after it appeared (*Scottish Medical and Surgical Journal*, October, 1899), and his three subsequent publications[1] have confirmed the impression produced by the first. Since the injection of saline solution was begun in the Glasgow Maternity Hospital, the mortality of eclampsia in that institution has been only 17 per cent. During the previous fifteen years the mortality was 47 per cent., so that the value of this addition to our

[1] *Brit. Med. Journ.*, March and May, 1900; March, 1901.

resources has been clearly proved. Its simplicity, and its freedom from dangerous results, are also greatly in its favour. A clean douche-can or a glass or metal funnel, three or four feet of rubber tubing, and a large hypodermic or small aspirating needle are the essentials. The water should be boiled and allowed to cool to 100° F., a teaspoonful of common salt being added to each pint. The needle having been introduced through the skin below the clavicle, the douche-can may be hung on the wall and left, while the solution gently flows into the subcutaneous tissue, whence it quickly but gradually enters the circulation. This method ("hypodermoclysis," as the Americans call it) is certainly safer than introducing saline solution straight into a vein. It is much easier and very nearly as rapid in action. The point insisted on by Jardine is that, in the treatment of eclampsia, the main object is to restore the renal function—to set the kidneys working again. This indication is well met by saline infusion.

Having referred to Nicholson's theory as to the cause of eclampsia, and mentioned the administration of thyroid substance as a method of prophylactic treatment, it remains to round off our subject by considering the bearing of Nicholson's work on the treatment of actual eclampsia. This writer points out that, according to his view, the two main aims in treatment are—(1) reädjustment of the processes of nutrition, so as to favour the complete metabolism of nitrogenous substances; and (2) reëstablishment of the secretion of urine. Thyroid substance meets the first requirement, being well known to favour metabolism. In the presence of actual convulsions, however, it is rather late in the day to think about complete metabolism; and it is mainly by producing renal action that thyroid substance may be found of value. Nicholson holds that the poisons which cause eclampsia are powerful vaso-constrictors, and act more especially on the renal vessels, thus leading to suppression of urine.

In support of this view the following points may be noted:—(1) In eclampsia the radial arteries become contracted, and the peripheral resistance increases as convulsions become imminent. (2) The blood-pressure becomes permanently raised in the pre-eclamptic state. (3) When the blood-pressure is at its highest, and the radial arteries are most

contracted, the secretion of urine is at its lowest. (4) On the reëstablishment of diuresis the blood-pressure falls and the radial arteries enlarge.

Thyroid substance is proved to be a powerful, rapid, and permanent vaso-dilatator, and if in eclampsia it be administered so as to produce symptoms of thyroid intoxication, it appears that the spasm of the renal vessels is relaxed and diuresis follows at once. "Should the symptoms have developed up to the suppression of urine, and if convulsions have occurred, the main object of the remedy is to re-establish renal activity. It must then be sufficiently pushed to produce its full effects upon the circulation. It is necessary to produce symptoms of 'thyroidism' as rapidly as possible, for then we know that the arterioles are fully relaxed. Ten or fifteen grains of the dry extract may be given by the mouth and repeated every hour if necessary; or, if the patient cannot swallow, similar doses of the liquor thyroidei must be injected hypodermically." The cases in which this treatment has been tried are as yet too few to be conclusive, but their results point to the correctness of the view above mentioned.

The present writer recently observed a case in which the following was the sequence of events. Late on Monday evening two serious attacks of convulsions occurred, for which morphia was given. During the twenty-four hours of Tuesday, 45 grains of thyroid extract were given: there was complete anuria and semi-coma. During the first eighteen hours of Wednesday, 35 grains of thyroid were given; the anuria and semi-coma continued. On Wednesday evening twenty-five ounces of urine were passed; and on Thursday there was free diuresis and a generally improved condition. Labour began spontaneously in the afternoon, and ended with the birth of a living child before midnight. Anuria then occurred for twenty-four hours, during which 25 grains of thyroid were given. The subsequent puerperium was normal.

Nicholson points out that the success of other remedies may depend upon their action in relaxing spasm of the renal arterioles and lowering blood-pressure. For morphia given in *large* doses acts as a prompt and powerful vaso-dilatator. Free bleeding lowers blood-pressure, and saline solutions introduced into the circulation have the same effect. It is probable

also that Veratrum viride acts principally by relaxing arterial spasm.

Here, at the least, are ideas which are suggestive and stimulating. Time and experiment alone can show their exact value in practical therapeutics. It has often been said that, just as the multiplicity of theories of eclampsia shows that we know nothing about it, so the many methods of treatment in use prove our inability to manage the condition. But the inquiry is being narrowed down. Theory and practice are alike much simpler than was the case a few years ago, and with work and patience much may be done in the immediate future.

# A REVIEW OF RECENT WORK ON OPHTHALMOLOGY.

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## TOXINES IN INFLAMMATION OF THE EYE.

In the *American Journal of Medical Sciences* for November, 1902, Dr. Robert L. Randolph gives an account of a series of interesting experiments which he has carried out to investigate the rôle of the toxines in inflammations of the eye. Starting with the known facts that the normal conjunctival sac has microörganisms constantly present in it, and that most inflammations of the conjunctiva are caused by the growth and multiplication of special bacteria either in it or on its surface, he proceeds to ask, How do these or, in fact, any organisms produce inflammation of the conjunctiva? Rejecting the idea that they act by irritation, as foreign bodies, he comes to the theory that they produce a soluble substance which affects the cellular elements of the tissue.

This is a proposition which is beset with difficulties when the attempt is made to prove it experimentally. The Koch-Weeks bacillus, the gonococcus and the diphtheria-bacillus are peculiar to man, and these bacteria will produce little or no reaction in the conjunctiva of animals, because the medium is not the proper one for their growth. Inasmuch as they do not multiply, there is no formation of toxines, and hence the absence of inflammation when these bacteria are introduced into the conjunctival sac of the rabbit.

Dr. Randolph then arrives at the main question of his investigation: What part do the toxines play in causing conjunctival inflammation?

Morax and Elmassian,[1] as the result of thirty-eight experiments, found that the ocular mucous membrane of the rabbit reacted under the influence of the toxines of the gonococcus, the Koch-Weeks bacillus, the Morax-Axenfeld diplobacillus,

[1] IXe Congrès Internat. d'Ophtalmologie, Utrecht, 1899.

and the staphylococcus, very much as does the human conjunctiva. They did not find that these toxines had much penetrating power, as prolonged contact was necessary to get the characteristic reaction. The reaction was not immediate, for there was always an interval of two or three hours between the commencement of the instillation and the time of the appearance of the reactional symptoms.

Dr. Randolph experimented with the toxines of the gonococcus, the diphtheria-bacillus, the pneumococcus, the Staphylococcus aureus, Micrococcus epidermidis albus, Streptococcus pyogenes, Bacillus coli communis, and Bacillus xerosis.

He first made forty experiments to test the effect produced by toxines when they are instilled into the conjunctival sac. In many instances the filtrate was kept in constant contact with the conjunctiva for hours, and only once did he succeed in exciting a conjunctivitis. In that case he thinks it was due to a tear made in the membrane during the instillations, an interpretation which is strengthened by the uniformly negative results obtained in the other thirty-nine cases. With the exception, then, of this case, Dr. Randolph's instillations of the filtrates into the conjunctival sac are directly opposed to the results which were obtained by Morax and Elmassian.

Dr. Randolph next tried the effect produced by toxines when they are injected into the conjunctiva. Thirty-one experiments were performed, and conjunctivitis resulted in every case—a marked contrast to the results obtained in the previous series of cases.

Several of the organisms with which he experimented, such as the Micrococcus epidermidis albus and the Bacillus coli communis, are not supposed to produce soluble toxines, but with a filtrate of these also he produced positive results. He tried control experiments with sterile bouillon, when no reaction was excited. He also excluded the possibility of the effect being produced by the so-called bacterio-proteïns described by Buchner.

In a third series of experiments he tried the effect of the toxines when they are injected into the anterior chamber. At first sight, as he says, one would suppose that the reaction in experiments of this character would be more intense and more destructive than when the injection was made into the

conjunctiva. Iritis was excited, but not panophthalmitis, and not sufficient inflammation to result in a closed pupil. This is explained by the fact that some of the filtrate oozed out of the anterior chamber; as long as the wound was open—and no doubt it remained so for several hours—there was more or less oozing. The filtrate which remained was certainly considerably diluted by the rapidly regenerating aqueous humour, so that the toxine in its original condition remained for only a brief time in the anterior chamber.

Dr. Randolph considers that he has brought forward enough evidence to show that the filtrate from cultures of the organisms which were used in these experiments is sufficiently irritating to set up inflammation in the conjunctiva and in the iris. That the bacteria in the rabbit's conjunctiva play a part in this inflammation is, he thinks, almost certain. The effect of the toxine is simply to irritate, and in this way to lessen local resistance. We know that the normal human conjunctiva is rarely, if ever, free of bacteria, several of which have very slight pathogenic properties, but that when an irritant is applied to the eyeball the conditions are at once produced under which these very organisms become pathogenic and do harm.

Dr. Randolph next proceeded to study the bacteriology of the normal conjunctiva of the rabbit in forty-seven cases, and found quite a variety of organisms. The commonest was a micrococcus which proved to be the Staphylococcus albus; it occurred in thirty-six out of the forty-seven cases. This organism is known to be feebly pathogenic, but, given sufficient irritation, it can and often does produce inflammation.

The experiments recorded in this paper go to show the great importance of the integrity of the epithelial surfaces in protecting against local and general injuries from toxines secreted by bacteria. We were familiar with this protective influence in guarding against local and general infections by the bacteria themselves, although there are bacteria which can attack the normal epithelium. Inasmuch as bacteria in general are more virulent when they are accompanied by their toxines at the time of their invading the animal body, it was of importance to determine, as has been done in this paper, the action of the toxines separated from the bacteria upon the intact conjunctival membrane.

It is interesting, further, to note that injection into the eye, particularly into the substance of the conjunctiva, would seem to make a more delicate biological test for the recognition of certain toxines than the tests which have usually been employed to determine this point. For, as has been already mentioned, filtrates used from cultures of bacteria not previously known to secrete soluble toxines, when injected into the conjunctiva, produced some inflammatory reaction.

### METHODS FOR THE PREVENTION OF THE SPREAD OF TRACHOMA.

In the last review of Ophthalmology in this Journal, the writer quoted a paper by Dr. A. E. Davis, showing that since the enforcement of a law prohibiting the entrance of immigrants afflicted with trachoma into the United States, there had been a considerable decrease in the amount of that disease in its eastern cities. In the *Boston Medical and Surgical Journal* for October 2, 1902, Dr. Myles Standish claims that this decrease must not be attributed wholly to the excluding of affected immigrants, but that it is also in part due to the fact that trachoma-cases can be so much more promptly cured than formerly, so that there is much less opportunity for them to infect other members of the community. This improvement in the mode of treatment commenced some fifteen years ago, when the idea began to prevail that the proper method of getting rid of trachomatous granules was to deal with them surgically and, as they are probably contagious, antiseptically.

Of late years so-called "expression" has been generally adopted. After the follicles have all been emptied, Dr. Standish vigorously rubs the surface of the evacuated follicles with solution of bichloride of mercury (1 in 500), conveyed on a cotton-ball wound upon the end of a stick. The effect of this treatment is surprisingly prompt. In twenty-four hours the patient can open the lids perceptibly wider. The follicular stage, which formerly occupied from three to five months, has entirely disappeared, and the conjunctiva, which at the time of operation seemed hopelessly lacerated, looks smooth and shows no trace of its rough handling. He thinks that a case can be absolutely cured within a period of one or two years.

As a proof of the diminution of the amount of trachoma, he quotes the following figures compiled from the case-books of Massachusetts Charitable Eye and Ear Infirmary. The proportion of cases coming to the Out-patients' Department suffering from trachoma were as follows:—In 1880, 3·5 per cent.; in 1881, 3·6 per cent.; in 1882, 4·1 per cent.; in 1883, 3·7 per cent.; in 1884, 3 per cent.—an average of 3·5 per cent. for the five years. Comparing this with the last five years, we find that there were in 1897, 1·3 per cent.; in 1898, 1·4 per cent.; in 1899, 1·2 per cent.; in 1900, 1·1 per cent.; and in 1901, 1 per cent.; being an average in the five years of 1·2 per cent. Again in the years 1880–1884 the total number of in-patients in the infirmary was 2,611; of these 329 were trachomatous, or 12·6 per cent., while during the last five years the total number of in-patients was 4,905, of whom 148 were trachomatous, which gives us only 3 per cent.

As showing that this remarkable diminution is not entirely due to the exclusion of trachomatous immigrants, but probably also to improvement in treatment, Dr. Standish quotes the following figures giving the average length of time the patients stayed in the hospital. In 1880 it was 79·8 days; in 1881, 86·4; in 1882, 64·7; in 1883, 55·07; in 1884, 50·2; being an average of 64·5 days per patient. To compare with this are given the statistics of the last five years. In 1897, 36·5 days; in 1898, 25·7; in 1899, 31·4; in 1900, 21; in 1901, 37·3; being an average of 29 days.

Dr. Standish sums up with the following conclusions:—

(1.) That the modern treatment is far more efficacious. On the face of the tables we should say that the proportion is as 29 is to 64·5, but in reality the efficiency is much greater, for the trachomatous case now leaves the hospital well on the road to recovery and, if properly followed up, without much danger of impairment of vision, while twenty years ago it was rare indeed for a trachomatous case to leave the hospital with a perfect cornea.

(2.) That as the actively contagious stage is over when the patient is discharged, fewer of his associates become infected.

There is, however, another factor responsible for the diminution in the amount of trachoma in the eastern cities of the United States, besides the exclusion of affected immigrants and the improvement in treatment, which has not been taken into account by either Dr. Davis or Dr. Standish. This becomes evident from a paper in the *Medical Record* for July 5, 1902, by Dr Richard H. Derby, entitled "Contagious Ophthalmia in Industrial, Residential, and Public Schools, and in Asylums and Hospitals."

In 1886 the New York Academy of Medicine appointed a committee to study and report on the subject of contagious eye-disease in the asylums and residential schools of that city. They received reports drawn up by well-known ophthalmic surgeons from 51 institutions, containing 12,684 inmates; of these 3,862 were declared to have contagious ophthalmia, or one out of every four. To meet the exigencies of the case, the committee was satisfied that legislation was needed, and to that end "An Act for the Better Preservation of the Health of Children in Institutions" was drawn up. It was passed by the Legislature on June 14, 1886.

This Act provided that each institution for the care of children should have attached thereto a regular physician, whose duty it was to examine each child applying for admission. It declared that no child suffering from any contagious or infectious disease should be allowed to enter or remain in any institution in contact with children not so affected, but should be immediately isolated or placed in a proper room or infirmary provided for that purpose. It provided against the overcrowding of dormitories. It made it incumbent upon the physician of each institution to render to the local Board of Health a monthly report, declaring therein all cases of contagious disease whatever that existed among the children under his charge.

The results produced as regards ophthalmia by fifteen years of operation of this law are shown by the following figures:—

In 1886 the New York Juvenile Asylum showed 17·7 per cent. of ophthalmia; in 1902, 2·5 per cent.

In 1886 the Five Points House of Industry showed 66·5 per cent. of ophthalmia; in 1902, 4·4 per cent.

In 1886 the House of Our Lady of the Rosary showed 18·3 per cent. of ophthalmia; in 1902, 1·6 per cent.

In 1886 the House of Refuge showed 16·2 per cent. of ophthalmia; in 1902, 7 per cent.

As an example of the system of dealing with ophthalmia which has now been introduced into the schools, Dr. Derby quotes what is done at the Catholic Protectory. In 1886 the inmates showed 40 per cent. of ophthalmia. Now the percentage of contagious cases is only 3·7. These are reported monthly to the Board of Health, as required by law. The children on admission are examined and immediately isolated if they exhibit contagious eye-disease. A building has been constructed for the purpose of isolation, which is equipped with school-room, work-room, sleeping-room, shower-baths, &c. Isolation is absolute, until the cases are cured. Then they are sent to the main buildings, where they wash apart from the others, and are inspected tri-weekly for fear of a relapse, in which event they are returned to the eye-pavilion. Each child in the institution has its individual towel, and its own jet of water—no basins or bath-tubs being used in the institution. The linen and towels of the contagious pavilion are disinfected and washed separately. Each month the eyelids of each inmate are everted and examined as required by law. Each day a visit is made and treatment given.

Much as has been accomplished in limiting the disease in these asylums, much remains to be done. Nineteen per cent. of the candidates for admission to the schools are found to have trachoma. All these children attend the public schools of New York City. An examination of the eyes of the children at two of these schools showed in one 19·2 per cent. of the boys had communicable eye-disease, and in the other 15·5 per cent. A partial inspection of the eyes of children attending these schools has already been instituted by the Board of Health. Dr. Derby urges that this should be much more thorough, not left to the teachers, but conducted by competent men, the eyelids being in each child everted. He states, however, that at the present time there is no hospital in the city adequate for the reception and care of all cases that would thus be found, though fifteen years ago he advocated the erection of such a building.

It is instructive to turn from the United States, where these active measures are being taken to check the spread of granular ophthalmia, to the sad description which MM. Morax and Lakah give of the affection in Egypt, where for ages practically nothing has been done to limit its spread. Their paper, entitled "Clinical Investigations on the Etiology of Trachoma in Egypt," is published in the *Annales d'Oculistique* for November, 1901. Having first mentioned how in Egypt it is quite the exception to find a native who, when the lids are everted, does not show signs of either past or active trachoma, they proceed to demonstrate that it is in childhood that the infection is most frequently contracted.

In Alexandria the Sisters of St. Vincent de Paul manage an asylum for orphans and deserted children. The latter are received mostly a few days after birth, and are nearly all the children of Europeans. They are at once given out to native wet-nurses, and after remaining with them for two years in their houses return to the asylum. We have thus to deal with European children who for the first two years of life are placed under conditions similar to native children.

On April 30, 1991, when the wet-nurses came to receive their pay, 63 of these children were examined, and 14 presented a typical trachomatous conjunctival condition—a proportion of 20 per cent. This does not represent the total number likely to become affected, as some of the children had only been for a short part of their time with their foster mothers. Of the wet-nurses of the 14 affected infants eight had active conjunctival disease, five cicatricial lesions, and only one was exempt from all trace of granular disease, past or present. In the children nursed by the eight mothers with active granular conjunctivitis the source of infection is obvious. In the others, whose foster-mothers had only cicatricial changes, some other source of infection must be sought for.

MM. Morax and Lakah visited the homes of these wet-nurses, and in each found numerous cases of trachoma amongst older children or adults living in the same room. It is easy, they say, to understand how infection may spread when one sees the small room in which six or eight persons live, opening with three or four other rooms, occupied by neighbouring

families, on a small courtyard. Actual contamination is most frequently conveyed by the hands, as no pocket-handkerchiefs are used, and the usual way in which a mother removes the conjunctival discharge from a child's eye is by the fingers. The custom of blackening the eye-lashes with kohl applied by a feather, the same feather being used by the whole family, is also liable to spread infection.

After the second year the children are taken from their foster-mothers and placed in a building together with some European orphans.

MM. Morax and Lakah examined 95 of these foundlings and orphans. They divide them into two series:—(1) The older children between 12 and 17 years of age comprising more orphans than foundlings; of 20 of these, 7 presented typical granulations, 13 had no conjunctival disease. (2) Children between 12 and 2 years of age; of 75 of these, 56 had granular ophthalmia (74 per cent.). The average number of cases of granular ophthalmia among the children in several native schools which they examined was 93 per cent. It will be seen, then, that if a child escapes being infected during the time it is being nursed, it is exposed to great risks of infection during its school life.

When prophylactic measures are contemplated for granular ophthalmia in a country where it is so widely diffused as Egypt, immense difficulties present themselves. For the foundling children, Morax and Lakah suggest artificial feeding in place of exposure to the risk of infection in the wet-nurses' houses; complete separation of the children in the school into affected and non-affected; and the frequent washing of the hands of the children.

As the result of their observations the authors do not think that climatic conditions or race have any influence in the development of the disease. Dr. Alfred Osborne, however, who has had five years' experience in a large polyclinic in Alexandria, in an article, "On the Relation of Epidemic Conjunctivitis in Egypt to Climatic Conditions," in the *Archiv für Augenheilk.*, Vol. XLIV., No. 2, says that the increase in eye-diseases in the hot months from April to August or September follows a curve approximately like that of all the plagues of Egypt—light, heat, dust, the overflow of the Nile, and flies.

### A FAMILY TENDENCY TO GLIOMA OF THE RETINA.

Mr. J. B. Lawford and the writer, in a report which they made on sixty cases of glioma of the retina, could not find any instance in which more than one member of the family had suffered from the affection. Prof. Fuchs has, however, recorded how he has met with two children of one family with glioma of the retina, and a third with a typical congenital coloboma of the iris and choroid, and Mr. C. D. Marshall gave the details of a family of six children, three of whom had new growths in the eye; in one it was definitely proved to be glioma and in the other two it was presumably the same.

The most remarkable record of a family tendency to glioma of the retina yet described is that given by D. R. Earle Newton in the *Australian Medical Gazette* for May 20, 1902. A little girl, aged two years, was brought to him with both eyes involved by glioma. The mother stated that the patient was the youngest of a family of sixteen children. Of these, two had died within a month or two of birth of bronchitis, four are still alive and well, and the remaining ten had all been affected by glioma of the retina, and all of them, except the present patient, were dead. None of the children lived beyond three years, except one, which was operated on for unilateral growth, and which lived to five years, dying of a local recurrence. In the only other one which underwent operation the tumour recurred in a few weeks, and was rapidly fatal. Of the ten cases, only three, including the two operated on, were unilateral, and seven cases were bilateral, giving a percentage of 70 of bilateral cases. This is interesting, as the percentage of bilateral cases is usually given as about 20. Of the seven children who died without operation, the eyeballs ruptured in every case except one, which was bilateral, and this child was said (by the medical attendant) to have died of cerebral implication. Five cases were males and five females. One of the father's brothers was said to have died in infancy of some eye-complaint, the nature of which cannot be determined.

### RESULTS OF THE USE OF THE GIANT MAGNET FOR REMOVAL OF FOREIGN BODIES FROM THE EYE.

In the *Journal of the American Medical Association* for August 30, 1902, is a paper by Professor Haab, of Zurich,

describing his experience with his large magnet during the seven years which have elapsed since he introduced it to the profession. It is interesting to compare the statistics of the results which he gives with those which have been obtained with his instrument at the Royal London Ophthalmic Hospital in the hands of different members of its staff. These latter have been collected and published by the senior house-surgeon, Mr. A. F. MacCallan, in the Ophthalmic Hospital Reports, Vol. XV., Part II. In order to compare the two sets of figures the writer has had to group those collected by Mr. MacCallan somewhat differently from the way in which he had arranged them in his paper.

The following are the figures given by Professor Haab with the corresponding ones worked out from Mr. MacCallan's report beside them :—

| —— | Haab. | Moorfields. |
|---|---|---|
| Number of cases in which large magnet was used | 165 | 38 |
| Number from which foreign body was removed | 141=85·4 per cent. | 34=89·4 per cent. |
| Number in which it was situated behind the lens and iris | 134=81·2 per cent. | 33=86·8 per cent. |
| Number of latter in which foreign body was removed | 111=82·8 per cent. | 29=87·8 per cent. |
| Number of cases in which eye was lost | 48=29 per cent. | 16=42·1 per cent. |
| Number of cases in which eye was saved, but useless | 19=11·5 per cent. | 3= 7·8 per cent. |
| Number of cases in which eye was saved with some vision | 71=43 per cent. | 14=36·8 per cent. |

The above shows that the proportion of cases in which the foreign body has been removed from the eye by the aid of the large magnet is slightly greater at Moorfields Hospital than in Professor Haab's cases. It appears, however, also to show that the proportional number of eyes ultimately saved there is considerably smaller. Whether or not this was really so cannot be definitely determined, for, unfortunately, Professor

Haab does not account for all his cases. He says :—"In my 165 cases I had to remove the eye 39 times ultimately because of purulent inflammation of the primary wound. In nine cases lingering cyclitis set in, generally brought on by the injury and not by the operation. Nineteen eyes were preserved, that is, saved from inflammation, but they were sightless. In 71 cases the eye could be used or could be made of use by a cataract-operation, and 51 of these 71 eyes healed with good sight." Thus it seems that the number lost from suppuration or cyclitis was 39 + 9 = 48, and the number preserved with or without vision was 19 + 71 = 90, giving a total of 138. This leaves 27 cases in which we are not told what happened.

There is also a discrepancy in the figures in another part of Professor Haab's paper. He says :—"Of the whole number of 165 cases in my experience the operation only failed 23 times. The operation was successful in 141 cases, or in 86 per cent." Thus, in one case we are not told whether operation failed or was successful.

The following directions, as to the mode in which Professor Haab considers that his instrument should be used, are well worth quoting :—The patient's eye should as a rule be brought into such a position relative to the instrument that the point of the magnet is opposite the middle of the cornea. For, above all things, we must avoid drawing the splinter into the ciliary body, whence it is very difficult to bring it further forward. It is only when we must assume that the foreign body is so large that in drawing it backward toward the middle of the anterior chamber it might closely graze and injure the crystalline lens that we should bring the lateral part of the cornea opposite the magnet. But since in the majority of cases the lens has been already injured by the entrance of the splinter, such consideration for the lens is of no great importance. It generally happens, then, that a splinter located in the space of the vitreous body, or in the retina, is drawn forward either quickly or slowly and slides around the lens. It follows in whatever direction it finds the least resistance. It also pierces with the greatest facility the zonula Zinni, and appears behind the iris, which it causes to bulge out a little. The bulging of the iris must be at once noticed by the operator, for he must as quickly as possible open the electric current, or rapidly push back the

patient's head. The splinter must not penetrate the posterior surface of the iris, but must be drawn obliquely through the pupil into the anterior chamber. If it is, therefore, behind the temporal part of the iris, the patient must look in that direction, and if the pupil has been put under the influence of atropine and cocaine before the operation, it is generally possible without much difficulty to draw the splinter from behind the iris, and through the pupil. But this part of the operation demands all the skill and attention of the operator, and also a certain amount of patience. He should never hope or intend to extract the splinter through the iris. It would not succeed at all with small splinters, and large ones would tear the iris too much.

The splinters having been drawn through the pupil into the anterior chamber, can be entirely extracted by an incision made at some convenient spot in the cornea, corresponding in size with the splinter. For this purpose it is best to make use of Graefe's cataract-knife, which should pierce the cornea as perpendicularly as possible. The aqueous humour must not flow out. Then the more pointed end of the large magnet is pushed a very little into the cut, and when the current is closed, as a rule, the splinter is quickly seized by the magnet.

Professor Haab considers that splinters which enter through the sclera are better drawn into the anterior chamber, and that it is advisable to leave the sclera alone, so as to avoid further damage to the vitreous. It is much more difficult to extract a splinter through the sclera than through the cornea, because in operating on the sclera it is impossible to see what is going on.

# Public Health.

## THE HEALTH ASPECTS OF LONDON LOCOMOTION.

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THERE is every prospect for the Londoner in the near future of a departure from the methods of travel in and around his great city to which he has been in the past accustomed. "Tube" electric-traction railways have been constructed and opened for traffic; and numerous rival and competing schemes of a similar nature have already occupied the attention of Parliament, although but few have as yet emerged from the ordeal of committee. Electric trams traversing the main thoroughfares are already to be seen in many of the London suburbs; and there is talk of shallow subway electric trams, of overhead and light railways, and of motor omnibuses.

The health aspect of this question of improved locomotion is one to which attention may appropriately be called at the present time, the ever-increasing concentration of the population in London and other urban centres rendering the health problems of town-dwellers matters of national importance.

Most people are convinced, in the case of London, that facilities for more rapid transit in and about the metropolitan area are urgently called for. Rapid transit from the suburbs to the centre is intimately connected with the problems of the better housing of the working classes, the demolition of slums and insanitary areas, and the improvement of the public health. Trade and business suffer from congestion of traffic in the streets and on the railways. Delay means loss and decreased profits, which lead to periods of depression, loss of wages, and unemployed labour with all its terrible evils.

The necessity for better methods of locomotion being conceded, the question of the best means to be adopted for effecting rapid locomotion have next to be considered. Those

who are interested in this question should consult Mr. Sidney Low's article on "The Tangle of London Locomotion" in the December number of the *Nineteenth Century and After*. Only the health aspects of the question can be dealt with in the present article.

Tube-railways are still such a comparative novelty that the question of the healthiness of this mode of travel has not yet been fully determined. Dr. Wynter Blyth, in a presidential address on "Ventilation" to the Incorporated Society of Medical Officers of Health in October, 1901, gave the results of some experiments on the ventilation and condition of the atmosphere in the tubes and stations of the Central London Railway. The chief cause of the movement of air in the tubes, stations, lifts, and stairways is the passage of the trains along the tubes, which the carriages nearly fill, thus acting as a piston in a cylinder, driving air before them and sucking it in from behind in their progress from one station to another. The condition of the atmosphere, as shown by the amount of carbon dioxide it contained, was not excessively foul, the largest amount of $CO_2$ ascertained to be present being 11·9 parts per 10,000 vols. This sample was taken in a carriage containing twenty-seven people between the Lancaster Gate and Marble Arch stations. The amount of $CO_2$ present in the air of the stations, lifts, and stairways varied between 8 and 11 parts per 10,000. In no case, then, did Dr. Wynter Blyth find the amount of $CO_2$ in the air of the Tube to be more than three times the amount usually present in the outer atmosphere of the London streets (average 4 parts per 10,000). Contrasted with the tunnel of the Metropolitan Railway, between Gower Street and King's Cross stations, where a sample of the air taken showed that $CO_2$ was present to the extent of 25·9 parts per 10,000, the air of the "Tube" railway is comparatively pure. Dr. Wynter Blyth's experiments were, however, too few in number to enable any far-reaching conclusions to be drawn, and, moreover, they did not differentiate between times of light and heavy traffic.

Quite recently Mr. Sutherland, F.I.C., F.C.S., has made some analyses of the air of the Central London Tube Railway for

the *Daily Mail.* During the periods of light traffic, when the number of passengers conveyed in the carriages is small, the air of the railway is fairly pure; during heavy traffic, however, the proportion of $CO_2$ rapidly augments. On various occasions in the busy times Mr. Sutherland found the air of the carriages to contain from 15 to 20·5 parts of $CO_2$ per 10,000—or from four to five times as much as in the outer atmosphere. It must be remembered that this excess of $CO_2$ is solely derived from human respiration and skin-transpiration, for there is no combustion of fuel or gas, as in the older underground railways, to augment the impurity of the air.

It may be safely asserted that constant travelling day after day, even if only for a limited period each day, in an atmosphere containing 15 to 20 parts per 10,000 of $CO_2$, such $CO_2$ being derived solely from a human source, must eventually tend to injure health. There are two other dangers in tube-travelling which require notice. First, the danger in the warm summer and cold winter months alike of bodily chill. In the hot weather the traveller passes suddenly from the warm street into a much colder atmosphere below the ground level. In the winter the reverse happens — the passenger, who has been warmed and enervated by the devitalised air below, meets the chilly wintry blast on emerging into the street. Secondly, the air of the tube being very dry and constantly in movement, there must be much organic dust of human origin floating in it. The dangers of tubercular expectoration are no doubt intensified in such a dry and shifting atmosphere as that of the "tube," and the cautionary notices to prevent spitting are wisely exhibited in every carriage. These, however, should be backed by a company's byelaw making it an offence punishable by fine to disregard the notice.

Messrs. Haldane and Osborn, in their recent report to the Home Office on the ventilation of factories and workshops, call attention to the unexpectedly foul condition of the atmospheres of large rooms, which were but scantily occupied by workers, but in which complete renewal of the air by fresh air from outside was seldom if ever effected. "Tube" railways present parallel conditions. The driving of the air of the tubes to and fro between the stations does not necessarily expel all fouled air to the street. There is bound to be a certain amount

of residual used air during the hours of traffic, which must be continually breathed and re-breathed by the public, although of course constantly diluted with incoming fresh air. It is gratifying to know that the directors of the Central London Railway intend to introduce a system of ventilation by exhaust-fans, so as to expel all foul air and renew the entire system with fresh air during the hours between the last train at night and the first train of the morning. This is a step in the right direction, but such a system of ventilation must necessarily be inoperative during the running-hours, when foul air is bound to accumulate in the underground workings.

In the next Parliamentary Session Committees will again be called upon to consider the merits of numerous "Tube" schemes for London. It would be as well if Parliament and the public would revise the point of view from which they consider such proposals. From the health point of view they are certainly not desiderata, but should be rather regarded as necessary evils to be restricted to parts of the metropolis where other methods of transit are impracticable from cost or exigencies of traffic. In the United States tube-railways have been generally rejected for the very reasons of health here asserted. We should be very careful how we encourage projects which may have an insidious bearing on the future health of the community, and perpetuate evils of underground travelling from which so many at the present time suffer.

Parliamentary Committees should in future impose the following conditions upon the promoters of tube-schemes so as to ensure the best available health conditions:—(1) The used air of all underground workings to be exhausted daily, and renewed with fresh air between the hours of running. (2) Spitting to be an offence against the company's byelaws, for every contravention of which the company should be bound to prosecute. (3) Overcrowding of carriages beyond the seating-capacity to be absolutely prohibited, and no more persons to be conveyed to the platforms than the trains are capable of taking.

It may be urged with truth that overcrowding of early and late trains on daylight routes of railway is permitted; or, if not permitted, is practically impossible to prevent. With regard to this, it may be answered that two wrongs do not.

make a right; and in the case of the "tube," overcrowding is especially deleterious, as it is impossible to obtain pure air in the "tube" for the occupants of the carriages, as may always be done in a daylight route by opening the carriage windows.

In considering this question we must recollect that, if "tube" schemes are largely sanctioned for London, enormous numbers of people who live adjacent to the lines of route will hardly ever breathe fresh air from one year's end to another. They will travel by "tube" to their offices, shops, or factories, and home again by the same route, and unless business or pleasure take them out into the streets at night, they will live their entire lives in an artificially-tainted atmosphere. What can be expected from such a mode of existence but physical degradation and a lowering of the national health.

In considering improved methods of transit there appear to be two main principles as affecting the health question, which should be borne in mind, namely:—(1) As far as possible travelling should be done by daylight-routes open to the air of heaven. (2) Horse-traction should be as quickly as possible abolished in favour of mechanical methods.

(1) Light railways to connect up distant suburban or country districts to the main trunk lines, or to the termini of electric trams; overhead railways in the more central parts of the town; electric trams running on the surface in the suburban and main approach-roads, and continuing towards the congested centres of population in shallow subways lighted and ventilated at frequent intervals from the street overhead; these are methods of locomotion to be infinitely preferred for health reasons to underground systems of electric traction. In the warmer months the passenger can ride outside *en plein air*, and windows of railway carriages, or windows and doors of electric trams, can be widely opened. Even in winter when windows and doors must be shut, the passenger has always the fresh air at hand, and can provide himself with as much or as little as he requires. He cannot do this on the "Tube"; he has to breathe the air which the company provides him with, and has no control over its purity.

To enable trams to run quickly, the tram-thoroughfares must be wide throughout—not wide at places and constricted at others, where delay is sure to arise. Rapid transit is absolutely essential. Our existing main thoroughfares in and out of London are too narrow, too tortuous, and too congested for tram-routes. To widen, straighten, and remodel them is a task beyond the capacity even of the wealth of London. The Prime Minister's carefully studied suggestion for the creation of new arterial thoroughfares radiating from the centre of London in every direction is the only real solution of the problem. The initial cost would be enormous, but if the new arterial routes could be mainly constructed through the less-highly-rated residential districts, avoiding business districts and the present main thoroughfares, in the course of a few years the recoupment would be on an astonishing scale, as the betterment of site-values would correspond with the increased values of the shops and houses fronting on the new routes thus opened up. Schemes of this nature would involve large demolitions, and for a time much hardship to displaced occupants; but such hardships would be really of a temporary nature, as the provision of the new thoroughfares would enable many to move away to the suburbs, and provide them with cheap and rapid transit to and from their work, whilst some no doubt could be rehoused on the spot in lofty blocks of flats and dwellings to be erected on the cleared sites not required for the new roadway.

Mr. Balfour's idea is a notable and an ambitious one, but it has two immensely strong points in its favour. It makes provision for rapid daylight transit in the open air from the periphery to the centre, and it affords a prospect to the overburdened ratepayer of an ultimate defrayment of the cost of the improvements, which will also indirectly prove remunerative by their effect upon trade in the relief of that congestion of traffic which is daily becoming a more and more serious drawback to the prosperity of the community.

(2) Little need be said on the subject of horse-traction. Horses are slow, and they create the greater part of the filth and mud which render the London streets so dangerous and insanitary. The cost of scavenging, cleansing, and watering the streets of London is enormous, and is but little realised by the

public at large. The iron-shod feet of the horses break up and wear away the costly wood and macadamised pavements at an astonishing rate. If horses could be abolished from our streets, the cost of road-maintenance and scavenging would probably be reduced at once by 50 per cent., and possibly more in years to come, when wood had been entirely replaced by asphalte. The sanitary condition of the streets would be marvellously improved, and a corresponding improvement in the public health might be confidently anticipated.

Motor-traction of omnibuses, cabs, vans, and lorries could not, however, be worked to the best advantage under the existing conditions of London. To make such traction clearly remunerative, and cheaper than horse-traction, a uniformly higher rate of speed is essential. This would be impossible in the congested thoroughfares for through traffic of modern London, which were originally designed for altogether different conditions, and have only been tinkered at here and there ever since their first construction. New main thoroughfares, wide enough to provide a clear way for six or eight lines of vehicles going at different speeds, are of the first importance, not only for the means of rapid transit, which they themselves would provide, but for the relief which they would afford to the older thoroughfares, which would, of course, still be largely used for local short-distance traffic. It cannot be expected that commercial undertakings like railway and omnibus companies, and carriers of goods, will go to the expense of installing motor-traction for their vehicles in place of horses until the inducements offered by the provision of freer thoroughfares enable them to incur the outlay as one which will be immediately profitable. This is an aspect of the question which our municipal authorities are bound to consider. The inducement to horse-owners to take their horses off the roads would be afforded by the making of new main thoroughfares, and would be a strong argument in favour of such thoroughfares. Its realisation would mean a great saving of expenditure to the municipalities in the cleansing and maintenance of the roadways. It should not be forgotten that as motor-vehicles occupy less longitudinal space than a horse and vehicle, and as motor-traffic is more manageable than horse traffic, the streets could be used without congestion by a considerably larger number of the former than the latter.

The time has now arrived when an enlightened public opinion should make its voice heard on the future of locomotion in London. There has been a danger, not yet perhaps wholly past, of the passive and little-assertive Londoner being rushed into costly and ill-digested schemes of multiple "tube" transit. Parliament and the London County Council are now evidently at one in desiring further consideration of the whole problem before sanctioning isolated projects which would effect little in advancing the general welfare.

# THE WISDOM OF THE ANCIENTS.

## HIPPOCRATES.

THERE is often a tendency in individuals, who have attained to a higher position in life than they originally occupied, to keep out of sight the steps by which they have climbed—to kick aside the stool by which they have risen. So it is also to some extent in the case of knowledge. We forget the amount of information laboriously acquired by our predecessors, and the humble beginnings, without which our advance in science would have been impossible, and attribute to our own generation, or our immediate forerunners, all that has been brought to light from amongst the secrets of Nature. It is useful, then, to pause at times in our search for new facts, and to look back on the work of those who have gone before us, giving them as far as possible the credit due to them for their labours, and forcing ourselves to recognise that there was a good deal of knowledge extant in the world many centuries before the so-called scientific era of the century which has just ended.

In the case of medicine, we are fortunate in having available writings which go far back towards the foundations of our European system. In the works of Hippocrates we have a picture of the state of the healing art and its professors four centuries before the Christian era. Even the "Father of Medicine" does not profess to have himself formulated all the rules which he inculcates. He acknowledges, directly or indirectly, his indebtedness to earlier investigators, and recognises that it was only by a gradual progress that his art was elaborated. Yet he lived and wrote far enough back for our present purpose—that of endeavouring to realise the ideas working in the mind of a skilled physician in that remote past, and the state of the science of medicine as it then existed.

The writings attributed to Hippocrates are probably not all by his hand, nor even of the same date; but the majority of them are probably authentic. It is curious in reading them to recognise the mixture of exact observation and almost inexplicable error which is contained in them. Thus, in the domain

of anatomy, we find a very clear account of the external parts of the body. This was indeed natural in a community in which athletic contests were a main feature of social life, and the naked bodies of wrestlers and boxers were everyday objects of observation. Muscles and joints are well described, and the skeleton generally is thoroughly understood. Yet even here curious errors creep in. The sutures of the skull are apparently filled in from the imagination of the writer, although it might have been expected that, in the continual wars between the Greek states, skulls would have been plentiful, and well known to anatomists. The internal parts are in many instances correctly described. The lobes of the lungs were known, though all five lobes were regarded as belonging to one organ —a matter rather of description than of observation. The kidneys and ureters, the bladder and its ligaments, the spleen, the liver, and the intestines are all well understood. The distinction between nerves and tendons was, however, not yet made; at which we can hardly wonder, when we consider that it is not unknown for the incautious student at the present time to fall into a trap by mistaking the tendon of the popliteus muscle for a nerve. The veins and arteries were distinguished from one another, but the functions of each were not known, since only the faintest idea of the circulation of the blood can be traced in the writings of Hippocrates. It is in the description of the veins that the most extraordinary errors are to be found. When we read that two veins run along the tendons of the neck, over the vertebræ to the kidneys and testicles, we wonder what possible mistake of observation can have given rise to such a description.

In the realm of Physiology there is a similar mixture of truth and error. Hippocrates recognises that the brain is the seat of sensation and intelligence, and explains that the ear merely transmits sounds, while the brain interprets them. Yet elsewhere the brain is described as a gland, which pumps blood to different parts of the body. It is clear that these writings are by different hands. The physicians of that day were familiar with the fact that trephining on one side of the brain is followed by convulsions on the opposite side of the body. The connection between the spinal cord and the brain was also already understood, and the error of looking on it as marrow, like that of the

bones- a mistake perpetuated in the use of the word "medulla," which has survived to our own time. The stages in the development of the chick could hardly fail to claim attention; but the recognition of the analogy presented by these with the evolution of the human fœtus shows the beginnings of a science of embryology. The nutrition of the embryo by means of the umbilical cord was also understood.

Hippocrates propounds a theory of the development of sex, which has received some modern support, namely, that the male is produced as the result of impregnation just before the menstrual flow, the female during its continuance. In another passage—probably by another hand—the view is put forward that difference of food may exert an influence on the sex of the offspring—a dry diet on the part of the mother resulting in the birth of sons, a wet one giving rise to daughters. We may, in fact, say that the Father of Medicine knew just as much as we do of the origin of sex, no more and no less.

The doctrine of "pangenesis" formulated by Darwin, who held that all parts of the body contributed their quota to the reproductive elements, is anticipated by Hippocrates, who states that the seed is derived from all the moist portions of the body; but he seems to have thought that the spinal cord was specially concerned in the elaboration of the product. Another point which has given rise to much controversy in modern times, the question of the inheritance of acquired characters, is apparently held by Hippocrates to be placed beyond dispute by the facts which he adduces. The instance which he brings forward is that of Asiatic races who have become dolichocephalic in consequence of their habit of compressing the heads of their offspring to produce the long-shaped variety of cranium, which was admired in the East. The truth of this explanation of the phenomenon is obviously open to doubt.

The possibility of the evolution of mankind from lower animals was not recognised by Hippocrates, though it was mooted by some of the acute thinkers of antiquity. He realises, however, that a gradual advance has taken place in the social condition of our race, and he recognises that a struggle for existence must have taken place in the process, leading to the survival of the fittest. He tells us that originally men ate coarse food, and among it all sorts of unwholesome materials.

On this diet the weak died out, and only the strong survived. Experience gradually brought about an improvement in the *menu*.

To say that Hippocrates really originated the doctrine of the survival of the fittest is, of course, erroneous. Although the attempt to discover, in the writings of the great men of the past, germs of the ideas and discoveries which have illuminated later ages is always fascinating, the spirit which tries to detract from the merits of the real discoverers, by casting up against them such anticipations, is foolish as well as ungenerous. A discovery which falls to the ground is valueless, and has to be remade and finally established by another. In the old Greek philosophic writings many a flash of inspiration occurs, which might have led to great scientific discoveries, had the times been ripe for them; but until circumstances admit of proof as well as conjecture, great thoughts are as seed which falls on stony ground: no fruit results from them. In the writings of the poet Lucretius the atomic theory is set forth with extraordinary accuracy; and the experiments only recently made with Radium and allied substances point to the truth of the views therein maintained, as to the existence of a constant stream of particles given off from all material things. Yet this theory, highly elaborated as it was, led to no practical results, and was soon forgotten.

In the field of Medicine, with which we are most concerned, we find much in the Hippocratic writings that is of great interest. Among the ancients there was naturally a tendency to ascribe all diseases to the direct action of the gods, and therefore to except them from ordinary scientific laws. Perhaps we can hardly say that this view is extinct even at the present time. Hippocrates sets himself steadily against this doctrine. All diseases, he writes, are equally natural phenomena: even epilepsy, which many centuries later was still regarded as demoniac possession, is in the same category as the others. By thus applying ordinary canons of reasoning to pathology Hippocrates does a great service to medical science. His actual ideas of the nature of diseases are not, it is true, satisfactory. He regards them as definite things, which get inside the body, and are there digested. In this respect, perhaps, we cannot cast many stones at him. How many of us realise that

a disease is only a perverted state of a living body, and that we should not treat the disease, but the patient? If, however, we transfer Hippocrates' idea from the disease to the cause of it, we have, in the case of the process by which the infective diseases are got rid of, a curiously close analogy to the process of digestion. The process of bacteriolysis, in which the invading organisms are broken up by ferments existing in the blood, is very closely allied to the process of digestion by the secretions of, for instance, the stomach; while the action of the leucocytes in swallowing intruders is actually a digestive process.

The acuteness of Hippocrates' clinical observation and the clearness of his descriptions are exemplified in the well-known picture of the dying man. To this day the "Facies Hippocratica" is a household word in medicine. The succussion-splash in hydrothorax, also, still bears the name of its discoverer, or, at least, its first recorder. The tongue, as an index of the state of the alimentary canal, was known to Hippocrates, but probably not the value of the pulse. It is true that he speaks of a pulsation of the "veins"—arteries and veins not being clearly distinguished—but he makes no reference to its connection with any disease. It was known that some cases of convulsions are associated with the presence of fluid within the skull, these being, no doubt, cases of hydrocephalus or tubercular meningitis; and the existence of rare cases in which epistaxis takes the place of menstruation is also recorded.

Some glimmering of the importance of the subjects which we now classify under the heading of "Public Health" may perhaps be traced in the reference made in one of the books of Hippocrates to the effect of different waters in causing disease, and in the advice to boil water coming from low-lying places.

He also associates the formation of urinary calculi with life along the banks of rivers. The influence of climate on character, an idea afterwards elaborated by Buckle in his well-known work, is to some extent recognised by the older writer.

As therapeutic measures, hot bottles were known to the Greek physicians, while in some cases bags of hot grain were used instead of them. Inhalations and baths were also among the recognised methods of treatment. But Hippocrates was

too good a physician to have recourse to vigorous measures in all cases, and he recommends a masterly inactivity as being in some instances the best possible treatment. "Sometimes it is a good remedy to withhold all treatment." This may be compared with his equally memorable saying that the first rule of treatment is to do no harm—a rule as applicable in our own time as 400 years B.C.

In the domain of Surgery a very high degree of skill seems to have been attained. Fractures and dislocations were necessarily common accidents in any community in ancient times, and splints and other apparatus were devised to deal with them. The use of pulleys to reduce dislocations was common, and extension was employed to aid in the setting of broken limbs. Hippocrates advises that the teeth should be bound together in cases of fracture of the jaw. The time taken in the process of repair of different bones was calculated out, and Hippocrates gives 10 days for the nose, 20 for the jaw, clavicle, and ribs, 30 for the bones of the fore-arm, 40 for the arm or leg, and 50 for the thigh. He also recognised that the marrow takes a part in the repair of bone. Wounds were to be kept dry, and at rest. Major operations were probably not common, though amputation must have been practised; yet Hippocrates speaks of nephrotomy for the evacuation of pus, and trephining was a recognised method of treatment. In the field of Gynæcology embryotomy was practised; and the advice is given to cover up the face of the woman, in order to avoid frightening her.

It is, however, in the advice which he gives as to professional conduct and deportment that we see most clearly the high ideals set before themselves by the old Greek physicians, and the advanced state of medical ethics at this time. The Oath of Hippocrates is too well known to be again set forth here. Elsewhere we find directions as to attending the poor gratis; as to calling-in others in consultation over difficult cases; and as to refraining from advertising. Frequent visits are advised, and careful examination. The physician should proceed calmly, so as to encourage the patient; but he must be firm in his directions and maintain his authority over him. No details are too small to be considered in the writings of Hippocrates. Thus the surgeon is enjoined to keep

his nails short for the sake of cleanliness, and to learn to use both hands for operating. As it is stated in another place that women are never ambidextrous, it might be inferred that Hippocrates did not approve of lady surgeons. The inference would probably be a safe one, were it not for the fact that the very idea of such a development could scarcely have entered his mind.

Quacks were then, as now, to the fore. Hippocrates laments that many men were to be found who "are ignorant and make gain by their ignorance, for they persuade those around them"; and elsewhere he writes that "he who deceives most, is most admired." But apart from the quacks, there were also separate schools of genuine practitioners, and no great love was apparently lost between them. Hippocrates attacks the Cnidian school for their too great attention to details, to the neglect of broad issues, and for their scanty use of drugs. It would seem that the tendency of the present time to be sceptical of drugs is by no means new: neither is it an unknown thing even in the twentieth century for it to be found that "what one brings forward as the best possible treatment, is thought by another extremely bad."

Finally, though every one knows the beginning of the celebrated aphorism that "Life is short, and Art is long," the continuation of it is not often quoted, but is none the less true. The whole passage runs:—"Life is short, and the art is long. Opportunity is fleeting, experience is treacherous, and judgment is difficult"—the words of a skilled physician, who recognised not only the need for the constant study of his art, but also the difficulties and the limitations of knowledge imposed on practitioners of medicine by the nature of the subject-matter of their science.

W. C. B.

## DIETETICS: A REVIEW.

*Practical Dietetics, with especial Reference to Diet in Disease.* By W. GILMAN THOMPSON, M.D., Professor of Medicine in the Cornell University Medical College. 2nd edition, enlarged and thoroughly revised. Pp. xxiii and 828. 1902. London: Henry Kimpton. Price 21s. nett.

*The Theory and Practice of Infant Feeding, with Notes on Development.* By HENRY DWIGHT CHAPIN, A.M., M.D., Professor of Diseases of Children at the New York Post-Graduate School and Hospital. With numerous illustrations. 1902. London: Baillière, Tindall, and Cox. Demy 8vo. Pp. 326. Price 10s. 6d. nett.

JUDGING from the numerous books which have lately appeared on the subject of Dietetics, the interest taken in this branch of treatment is increasing. Perhaps that scepticism as to the value of drugs, which one frequently meets with, leads to a greater amount of attention being paid to other matters. There can be little doubt that with most of us in the medical profession pay during our student-days too little attention to the question of dieting our patients, while, as to the preparation of the various articles which we order, few indeed could give any intelligible instructions to the cook. Yet there are many cases in which the selection and cooking of the food are of the last importance. The volume by Dr. Thompson would seem to attempt to reduce our knowledge of feeding to an exact science.

The physiologists tell us that certain amounts of proteid, fat, carbohydrates, salts, and water are necessary to maintain the equilibrium of nutrition and waste in a normal body. As we cannot, unfortunately, content ourselves with ordering such a physiological diet, but have to make the best of the different articles of food offered by our butchers and bakers, some elementary—not to say, alimentary—knowledge as to the values of such articles in the ultimate food-principles should form part of the training of medical men. It cannot indeed be expected that each of us is to carry in his head long tables of percentage compositions such as we find in the book before us, but rather that we should have clear notions as to suitable diets for various cases, founded on real

knowledge of their constituents. Again, even if we all know that different diets are suitable for different diseases, yet it is not always so easy to give an intelligent account of our reasons for ordering them. To take a simple example, it is common knowledge that a fluid diet is suitable for fevers; yet many a student of medicine will be found to hesitate when asked to explain the reasons for this selection; and one sees it gravely suggested to feed patients suffering from enteric fever upon beefsteaks. The indications in fever, as given by our author, are as follows:—(1) To save tissue-waste by supplying sufficient nourishment; (2) to give food in a form which will not overtax the weakened digestive powers; (3) to give abundant fluid, in order to relieve thirst and flush out the kidneys; and (4) lastly, to give alcohol in those cases which need it.

The question of the use of alcohol introduces a subject which has been much debated. Indeed, it is still disputed whether it is or is not a food proper. It can hardly be denied that it is a source of energy. Thus Atwater writes, "It (alcohol) does not require digestion, is absorbed by the stomach, and presumably by the intestine, with the greatest ease . . . . The kinetic energy resulting from that oxidation agrees very closely with the potential energy of the same amount of alcohol as measured by its heat of combustion . . . . and the alcohol serves to protect the body protein and fat from oxidation." Alcohol further acts as a stimulant to the nervous system, accelerating the heart-beat and the respiration, as well as the mental processes; it removes muscular fatigue, and renders possible a renewal of exertion for a short period when exhaustion has occurred. It is also a diuretic, and to some extent an anti-pyretic; and in small quantities it is an aid to digestion, increasing the quantity of gastric juice. Alcohol is generally forbidden to those who are training for athletic contests, and it is found that soldiers on campaign do better without it. Its harmful effects are especially to be looked for in those who are continually taking it into their system; in this way the tissues are constantly supplied with a lymph containing the poison, and have not time to recover from its effects. Those who can and do leave off the use of it occasionally, not only show that they have not formed a vicious habit, but suffer from no ill-effects.

One of the most important of foods in disease is milk, and, as Dr. Thompson points out, it is so easily prescribed and so easily measured that it is ordered as routine diet in hospital for a number of conditions without much consideration of individual needs. It should be remembered that an exclusive milk-diet becomes in time nauseous to the patient. It is often possible, by allowing small amounts of other substances along with it, to continue its use much longer than on a strict diet. The constipation induced by milk, and the flatulence from which some patients suffer, are also drawbacks to its employment. In many cases of gout, as pointed out by Dr. Michell Bruce among others, milk does not agree, and farinaceous food must be substituted even in the acute stage of the malady. It is to young children, however, that milk is most necessary, and in this connection a pure milk-supply is of national importance. To obtain this the greatest care is essential in the management of the dairies from which it comes. Not only must the cows be free from disease, but no possibility of contamination must be allowed to occur in the milking, or in the storage and transport of the milk. Nor do our difficulties cease with the provision of the pure article, for there remain countless obstacles to be overcome in adapting the milk supplied by the cow to the digestive capacities of the human infant. The gastric arrangements of the latter differ widely from those of the calf. An interesting account of the variations met with in the digestive organs of different animals is given in the first part of Dr. Chapin's book, and illustrations of them are there to be found.

Milk is a good culture-medium for most bacteria, so that any germs which gain access to it soon increase and multiply. They may be derived not only from the cow's body, but from water used either to clean the cans or to adulterate the milk. The hands of the milker are also seldom aseptic, and dust carried by the air may be laden with germs. It is important to use milk-pails of which the joints are carefully filled in with solder, in order that no crevices may exist in which bacteria can lurk. The Americans claim that they are far ahead of the benighted countries of Europe in the matter of milk-supply, and there appears to be some ground for the boast. A considerable portion of Dr. Chapin's book is devoted to the question of regulation of this service, and the advice given

is excellent. It may well be recommended to municipal authorities in this country.

It is difficult to over-estimate the importance of cooking from an invalid's point of view, and a very careful account of the various methods of cooking, and their respective aims and objects, is given by Dr. Thompson. As an example, we may quote his advice as to cooking eggs for sick people. These should not be boiled as usual, but kept for ten minutes at a temperature of 170° to 180° F. The same result may be obtained by pouring two pints of boiling water over two eggs, and letting them remain in it for ten to twenty minutes. It is advisable not to give the yolk of eggs in enemata since they contain a large quantity of fat, and this is not absorbed except by the villi of the small intestine.

The diseases in which diet is of the greatest importance are probably Diabetes mellitus and Obesity. With regard to the former there is on the whole little difference of practice concerning the articles of food allowed and forbidden. It is noteworthy, however, that there now is a tendency to avoid the very strict diet which used to be insisted upon, and to allow the patient a certain proportion of potatoes, for example, since it is quite possible that the almost total deprivation of carbohydrate food may lead to the onset of coma. In obesity a diet very similar to that enjoined in diabetes is generally recommended, but various special systems have been devised to reduce corpulence. It must, however, be recognised that individuals differ one from another, and that a diet which is very successful in one case may in another prove almost fatal if persisted in. Dr. Thompson gives a full account of the various systems in vogue. It is probable, however, that exercise is the true physiological corrective for corpulence, as it has been well pointed out that no one ever sees a fat postman!

In conclusion, we can recommend *Practical Dietetics* as one of the best, if not the best, book on the subject which we have seen. Dr. Chapin's book also deserves commendation, but it is difficult to say anything that is very new on the subject of infant feeding, and the subject is hardly extensive enough to demand a separate treatise. Hence a certain amount of the volume comes under the head of "padding."

W. C. B.

# Reviews of Books.

*A Treatise on Orthopædic Surgery.* By ROYAL WHITMAN, M.D., M.R.C.S. (Eng.), Instructor in Orthopædic Surgery and Chief of the Orthopædic Department of the Vanderbilt Clinic in the College of Physicians and Surgeons of Columbia University, &c. Illustrated with 447 engravings. London: Henry Kimpton. 1901. Pp. 650. Price 25s. net.

[With Plate XXI.]

THIS is one of the best works on orthopædic surgery in any language. If asked to mention its most salient features, one would readily reply, "Clinical investigation and treatment"; but pathology and ætiology are not neglected. Thoroughly practical, liberally and well illustrated, any surgeon will find in it a sound and complete guide to the surgery of deformities. The scientific basis of the methods of treatment are clearly stated; thus, in the brief but clear section on tendon-transplantation Fick's table of the relative strengths of the muscles of the back and front of the leg is printed as a basis for the ideal relative proportion of power to be aimed at in planning operations for tendon-transplantation.

Orthopædic surgery has come to mean the surgical treatment of deformities, having changed somewhat from its original meaning as a branch of surgery specially concerned with childhood. It is not many years since the writer of this notice had to listen to a speech from a most venerable physician, the president of one of our most learned medical societies; in this speech the "British Orthopædic Society" was defined as a "society for the study of deformities of the *feet*"! No one who has even glanced through Dr. Whitman's book can retain such a misconception, and the great number of good photographs of deformity in children will help to remind the readers that Andry's orthopædic work was the first recognition of the call for closer study of the affections of growth; and this was long before any hospital for sick children was founded. As an example of one of the salient features of the book, clinical investigation, the method of testing for psoas-contraction in

Fig. 1.

Fig. 2.

Fig. 3.

(From Royal Whitman's "Treatise on Orthopædic Surgery.")

cases of spinal disease, shown in the accompanying Fig. 1,[1] may be adduced; whilst the care with which the details of treatment is given may be seen in the Figs. 2 and 3, showing the author's splint for hip-disease in the convalescent stage. It is a good book, worthy a place in every medical library, and one that should be within arm's length of every surgeon who undertakes the treatment of cases of deformity.

*Cancer of the Uterus.* By ARTHUR N. H. LEWERS, M.D., F.R.C.P. (London), Obstetric Physician to the London Hospital. With 51 original illustrations and three coloured plates. Pp. 328. 1902. London: H. K. Lewis. Price 10s. 6d.

IN his introduction the author claims as his object in writing this work a desire to stimulate a more general interest in the subject of cancer of the uterus, and thereby to aid the profession in recognising the disease in a fairly early stage. He asks, "What can be done to prevent so large a proportion of cases of cancer of the uterus (95 per cent.) from being diagnosed only too late?" and answers the question by the suggestion that women should be taught the early symptoms by the distribution of a leaflet, to be issued, say, by the Joint Commission appointed by the Colleges of Physicians and Surgeons to investigate cancer. Such leaflets might be sent to medical men, hospital matrons, and others for distribution among adult women. The author approaches his subject from a clinical and utilitarian point of view, invoking the aid of the pathologist only to supply scientific proof of the correctness of diagnosis in cases operated on by himself. We fail to see his object for riding rough-shod over the sensibilities of the purist in pathology by designating sarcoma "cancer" in chapter 1. Further in the book, we find him labouring under the impression that the so-called "cauliflower" growth which extends as a large mass into the vagina is invariably an epithelioma, which certainly is not the case. Under physical signs of cancer of the cervix the author draws attention to a rarer form, in which the growth may exist without ulceration, projecting nodule, or patch, its presence being only detected by the increased diameter of the cervix and by hæmorrhage on passing the sound. We commend this fact

[1] For the loan of these illustrations we are indebted to the courtesy of the publisher, Mr. Henry Kimpton.

to practitioners as one which, if duly recognised, would tend to lessen the frequency with which cases are sent to the operator too late to be successfully treated by removal. The author has long been recognised as one of the exponents of the operation of supra-vaginal amputation of the cervix for cancer located in that portion of the uterus; it is interesting therefore to find that he has abandoned his former point of view and now poses as an advocate of total vaginal hysterectomy for cancer of the cervix. He gives amongst the reasons the fact, recognised also by others, that dysmenorrhœa due to stenosis of the os internum not uncommonly follows supra-vaginal amputation, and cites a case where complete atresia ended in hæmatometra and double hæmatosalpinx. He also states that recurrence has occurred in the body of the uterus after amputation of the cervix. We quite agree with his later decision that vaginal hysterectomy is the operation of election, and note with satisfaction that he has practically abandoned his former practice with regard to the operative procedure. We note too with approval that the author's experience has taught him that hæmostasis is best secured by ligature, and not by pressure-forceps. With the limitations placed upon the operation of vaginal hysterectomy we also quite agree. If the disease has trespassed into the connective-tissue collar of the cervix, and from thence into the parametric tissue at the bases of the broad ligaments, it is useless to attempt a radical cure. Adopting this view, the author does not commend the operation of clearing out the pelvic connective tissues and lymphatic glands by the abdomen after the ureters have been catheterised. The results of cases reported in America and on the Continent do not encourage English gynæcologists to attempt such a procedure. With regard to the difficulties met with in the operation of vaginal hysterectomy, the author refers to the concurrence of fibroids of the body of the uterus, and adds that fortunately uterine fibroids do not often coexist with cancer of the cervix. We must join issue with him over this latter statement, although it is quite true that *large* fibroids are seldom found in conjunction with cancer of the cervix.

Referring to the author's remarks on the results of his operations, we must remember that although his percentage of what the Germans accept as "absolute cures" looks high—

viz., 10 cures in 61 operations, or 16 per cent.—he has ignored the most important rule laid down by Winter, which runs :—"The percentages of 'absolute cures' must be made after having due regard for all inoperable cases, &c." Now, Dr. Lewers has kept no record of all the cases he has seen, but thinks those operated upon represent about 2 or 3 per cent. of all cases met with in his hospital and private practice. He has had 61 operations for cancer of the cervix, and 11 for cancer of the body—in all 72 operations. If this number represents only 2 per cent. of all cases of cancer he has seen, then the total number of cases in his practice amounts to 3,600, and of this number he has cured 19 by operation, *i.e.*, about ½ per cent.

On the other hand, Lewers' statistics represent the total number of cases operated upon, whereas Winter and Waldstein in their statistics subtract primary mortalities, cases lost sight of, and those who died from intercurrent diseases, before estimating "absolute cures." As long as every observer adopts rules for himself in making statistics, no use comes of trying to institute a comparison between the work in different clinics and in different countries. For this reason we cannot accept any of the figures offered by the present writer with regard to comparative statistics. In his statistical tables Schauta records 29·5 per cent. of "absolute cures" in all cases operated upon for cancer of the uterus; but he further tells us that the operable cases were only 14·7 per cent. of all the cases seen by him, and thus modestly puts his "absolute cures" at 4·3 per cent. If Dr. Lewers made his calculation on these lines, his figures representing "absolute cures" would be about ½ per cent. His statistics show that he has met with the usual degree of success in a branch of surgery from which we all look for better results in the future than have been obtained in the past.

The microscopic sections have been well drawn; those on pages 280 and 281 are the least commendable. Dr. Lewers has shown his wisdom in obtaining incontrovertible testimony, as to the nature of the growths removed by operation, from such a reliable pathologist as Mr. Targett. He can be congratulated on his instructive record of the work done by himself in a most interesting field of surgery.

*Abdominal Manipulation in Pregnancy.* By A. MACLENNAN, M.B., C.M. (Glasgow), L.M. (Rotunda, Dublin), Clinical Assistant to the Professor of Obstetrics and Gynæcology, University of Glasgow. With an Introduction by MURDOCH CAMERON, M.D., F.F.P.S.G., Regius Professor of Obstetrics and Gynæcology in the University of Glasgow, &c. London: Rebman, Limited. 1902. Pp. 245. Price 6s.

THIS little work has been published at a very acceptable time, and draws attention to a subject which, as the author states in his preface, has received only passing attention in this country. We are glad to note that the author at the outset of his work makes it quite clear that he is not advocating abdominal examination in pregnancy as a rival method to vaginal exploration, but rightly considers the two methods complementary. Practitioners who will take the pains to study Dr. Maclennan's work will belong to the class which employs all antiseptic precautions in vaginal investigations. Those who pay no attention to these elementary details are not likely to devote their attention to the study of abdominal palpation, and are the men who bring vaginal examination into disrepute. The work is intended by its author for "Practitioners and Students of Medicine." While we consider its value to the practitioner, and—by reason of its excellent bibliography—to the teacher of obstetrics, to be considerable, we are inclined to think that it is hardly suited to the needs of an average student. We find here a series of facts, industriously culled from German and other sources, and compressed into a small space. There they are left to argue for themselves as to the advantages and disadvantages of the method, without bearing even the impress of the author's individuality. This is not what a student requires, at any rate for the purposes of "pass" examinations. The majority of students like dogmatic teaching; and in the most successful students' text-books the personal pronoun is the stamp used by the author to drive his teaching home. Leaving the medical student out of the question, we commend Dr. Maclennan's industrious epitome of the facts bearing upon abdominal manipulation in pregnancy to the careful perusal of obstetric tutors and medical practitioners.

*The Evolution of Artificial Mineral Waters.* By William Kirkby, F.L.S., Lecturer on Pharmacology in the Owens College. Pp. 155. 1902. Manchester: Jewsbury and Brown, Ardwick Green. Price 3s. 6d,

IT might appear at first sight that the subject of mineral waters and their production did not promise to afford an inviting field for a book, but Mr. Kirkby has contrived from these dry bones to construct an interesting and readable volume. Many natural springs contain carbonic-acid gas in appreciable quantity, and medicinal properties were naturally ascribed to them, while the qualities of springs containing salts in solution was early discovered. It was therefore natural that an attempt should be made to imitate them artificially, as soon as the nature of the ingredients, which gave the peculiar quality to the waters, became known. An entertaining history of the progress of this art is given in Mr. Kirkby's book. The artificial aëration of water was first described in 1750 by Venel, who used hydrochloric acid, gas and carbonate of soda to form an effervescent mixture. The impregnation of water with carbonic-acid gas generated elsewhere was discovered by Lane (1769) and Priestly (1772). The apparatus now used for this purpose in a modern factory is described by Mr. Kirkby, and numerous illustrations are given, a number of photographs of Messrs. Jewsbury's factory being reproduced. The volume also contains a bibliography of the whole subject, and an adequate index.

*Official Year-Book of the Scientific and Learned Societies of Great Britain and Ireland.* London: Charles Griffiths & Co. 1902. Price 7s. 6d.

THIS carefully compiled publication comprises a list of all the learned and scientific societies of the three kingdoms, setting forth the names of their officers and the titles of the papers read during the year 1901–1902 (June to June). In future the time embraced will correspond with the ordinary sessional arrangement, running from September to June. This year-book has now enjoyed a life of 18 years, and evidently supplies a want. A study of the titles of the papers read at a number of scientific societies indicates clearly the trend of thought at the time, and

the direction in which research in the field of Nature is being pushed forward. With this view we commend the volume before us to the consideration of scientific investigators.

*A Manual of Bacteriology.* By HERBERT U. WILLIAMS, M.D., Professor of Pathology and Bacteriology, Medical Department, University of Buffalo. Second Edition. London: Rebman, Limited. 1901. Pp. 290. Price 7s. 6d. nett.

THIS book gives a brief account of bacteriological methods and of the chief pathogenic organisms. Its chief fault is its brevity, the descriptions of toxins, anti-toxins, and immunity, for example, being so short as to be of little value. The old Behring unit for diphtheria anti-toxin is retained. It contains a number of capital illustrations.

*Handbook of Bacteriological Diagnosis for Practitioners.* By W. D'ESTE EMERY, M.D., B.Sc., Lecturer on Pathology and Bacteriology in the University of Birmingham. London: H. K. Lewis. 1902. Crown 8vo. Pp. 215. Price 5s. 6d.

THIS book has been written in order to provide the practitioner with a guide to the methods of bacteriological diagnosis of disease. The practical details are described concisely and clearly, and a number of "tips" for the adaptation and manufacture of apparatus, &c., are given. Some pages are also devoted to the examination of the blood, preparation of specimens, section cutting, &c.

*A Text Book of Medicine.* Begun by the late CHARLES HILTON FAGGE, M.D., F.R.C.P. Completed after his death and since revised or rewritten by PHILIP HENRY PYE SMITH, M.D., F.R.S. Fourth edition. Vol. II. Pp. 1050. J. and A. Churchill. 1902. Price 21s.

THE second volume of this classical work, which from habit is spoken of as "Fagge's Medicine," though it has from the first owed much, and in subsequent editions more and more, to the mature experience of its editor, has followed with but little delay on the first volume of this—the fourth—edition. The text,

though retaining its former arrangement, has probably received more additions and alterations to bring it up to its high standard of contemporary knowledge than any other edition. Dr. Pye Smith has done a great service to Medicine in these pages, sorting out, so to speak, the wheat from the chaff from amongst the innumerable ideas and observations which have seen the light since the last edition of this work.

The writer of a text-book on medicine requires far more than the industry of the editor of a year-book; and his responsibilities in correctly gauging the substantial advances and the elements of value in passing fashions, and perhaps unduly advertised methods, are by no means light. It is not always fully recognised that there is much to be learnt by observing what is not mentioned in a standard work. There is, however, one criticism in the volume before us *à propos* of the Schott treatment which, though comparatively reticent, is so pregnant with thought that it is reproduced for the reader's consideration. "Some of the statements made as to the rapid and permanent diminution of the cardiac dulness can only be attributed to the difficulties of percussion and the remarkable power of expectation over the faculty of observation." The peculiar and almost personal interest in Fagge's Medicine, if we may still call it so, has always been that the practice and teaching of Guy's Hospital are fully set forth; this appears to have been part of the original writer's scheme. Dr. Pye Smith has added to this the broader historical interest attaching to the history of diseases and their names, and has, moreover, appropriately illustrated some of his remarks with the case-records of persons prominent in the world of their time. Of late years the effort of keeping up with the advance of medicine has tended rather to obscure the view of the past; even in Allbutt's "System of Medicine" the history of diseases was for the most part designedly omitted. Hence Dr. Pye Smith's work will still be a source of valuable reference even when it no longer faithfully presents contemporary medical knowledge. In conclusion, it is perhaps hardly necessary to add that from its completeness this scholarly text-book is rather strong meat for the student just entering on the threshold of medicine, and that it will not please the seeker after "tips," engaged in cramming up the necessary minimum of examination-knowledge. It is to the real student, whether

qualified or not, who knows enough to recognise his own limitations, that Fagge's Medicine will appeal in a way that is almost unique.

*Clinical Hæmatology.* By JOHN C. DA COSTA, JR., M.D. Eight full-page coloured plates. Three charts. Forty-eight other illustrations. Pp. 469. Rebman. 1902. Price 22s. 6d.

SOME apology is perhaps due to the author for the delay in reviewing his book on the blood. In this instance the delay is chiefly due to a prolonged testing of the contents of the handbook by the requirements of routine hospital practice. The book is evidently written by one who is not only a master of his subject but is thoroughly in sympathy with the student, and knows what is wanted and how to meet this need. In the main this treatise is on the same lines as Cabot's well-known work, and, like it, is essentially practical. A very full description of the technique of blood-examinations is rightly given, since so much depends on correctness of method. The illustrations are very well executed and will prove of great use to the student in enabling him to identify the various forms of corpuscles in systematic examination of blood-films. The author gives his own experience as to the blood in various diseases, and refers very freely to the results of others. The treatise is one that can be confidently recommended as the constant companion of those engaged in this branch of work, and is worthy of the author's distinguished name.

*Cancer and other Tumours of the Stomach.* By SAMUEL FENWICK, M.D., F.R.C.P., Consulting Physician to the London Hospital; and W. SOLTAU FENWICK, M.D., M.R.C.P., Senior Physician to the London Temperance Hospital, and Physician to the Evelina Hospital for Sick Children. Pp. 362. 70 illustrations. J. & A. Churchill. 10s. 6d. 1902.

[With Plate XXII.]

THIS is an important contribution to current literature, not only from the frequency of cancer of the stomach, but from the manner in which the authors have dealt with the subject.

## PLATE XXII

*Drawing of the posterior wall of a stomach showing a large chronic ulcer through which the pancreas projects in the form of a tumour.* (From Fenwick's "Cancer and Other Tumours of the Stomach." [1])

**For the loan of this illustration we are indebted to the courtesy of the publishers, Messrs. J. and A. Churchill.**

The clinical picture of gastric carcinoma is based on a study of 154 cases treated and examined after death at the London and Temperance Hospitals, and thus naturally challenges comparison with the more succinct clinical study of 150 cases of gastric cancer by Osler and McCrae. The work is divided into two parts, of which the first, on carcinoma of the stomach, occupies considerably more than half the volume; while the second deals with sarcoma, cysts, benign tumours, syphilis, and concretions of the stomach, and with malignant disease of the duodenum. The text is illustrated by the introduction of clinical cases to the number of 47, and conclusions are supported, though not overladen, by statistics. The section on carcinoma of the stomach begins with an account of the morbid anatomy. The authors' series of 265 cases showed that the pylorus was the site of the growth in 65·3 per cent., while in 1,850 cases collected for comparison from other sources the disease was located there in 58 per cent. The work as a whole is so careful and exhaustive that it is a pity that the term scirrhus, which should be used as a purely clinical term for a hard tumour, is employed to indicate a growth of a definite histological structure (hard spheroidal-celled carcinoma), inasmuch as hard tumours of the pylorus may have the structure of a columnar-celled carcinoma. The stomach is the site of the growth in 30 to 35 per cent. of all primary carcinomata, and though the death-rate in England from this disease has more than doubled during the last forty years, the increase during the last few years has only been slight. The writers believe that carcinoma obeys certain laws of epidemiology, like some infective disease, and bring forward reasons to suggest that the majority of cases of gastric cancer begin between September and February. The clinical aspects are very fully treated, and are dealt with from many points of view. In the section on treatment the surgical measures available are discussed, but not with any undue enthusiasm, and no mention is made of Moynihan's work in this direction. The chapter on primary sarcoma of the stomach is a valuable epitome of our knowledge, and shows that the disease is probably less rare than is usually believed. The illustrations are well chosen and capitally executed, and are in keeping with the admirable matter and form of this monograph.

# Notes by the Way.

**Smal-pox and Vaccination.**

THE present year will be an important one with regard to the action to be taken by the Government as to continuing or amending the existing state of the law respecting vaccination. From this point of view it is not entirely a misfortune that there seems to be a considerable amount of small-pox about the country, although London appears to be practically free from the scourge. According to the daily papers, Manchester and Salford, Stockport, Bolton, Shrewsbury, Chester, Crewe, Newtown, and other places are all suffering more or less severely from small-pox. Such facts will serve as a useful reminder, to keep before our minds the lessons which we learned during the London outbreak. We are glad to see that the new "Imperial Vaccination League" is showing signs of activity. On the 14th of last month an influential deputation waited on the President of the Local Government Board and impressed on him the importance of making re-vaccinatfon at the age of leaving school compulsory upon all except the "conscientious objector," or rather his children. It is much to be hoped that such an enactment will be made a feature in the forthcoming Bill.

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**Pure Lymph for All.**

THERE is another point, also set forth by the above deputation, which certainly demands the attention of His Majesty's Government, and that is the question of the supply of "official" lymph to all medical practitioners, or at least the supervision by the Government of the private trading companies which supply vaccine. At the present time only public vaccinators can obtain the lymph from the Government laboratories, while other practitioners, though they can legally vaccinate just as efficiently as the former, have to be content with anything which irresponsible trading concerns choose to call vaccine. There is absolutely no assurance that the

so-called lymph thus supplied is really active, and indeed it is notorious that a large quantity of inert "lymph" was on the market at the time of the London epidemic. This is eminently unsatisfactory. If the State makes vaccination compulsory, and at the same time decrees that private practitioners can perform the operation, it "doth follow as the night the day" that the State should guarantee that the lymph available to them is of a certain standard of efficiency. Our milk-supply is, as far as possible, secured, and steps are taken to guard the individual against false weights and measures; genuine vaccine should be similarly assured to all.

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**Surgery of Gastric Ulcer.**

THE invasion of the field of medicine proper by the surgeon goes on apace. Even Gastric Ulcer, which fills so many beds in our medical wards, is now to be submitted to the knife. Mr. Mansell Moullin in a recent communication to the Clinical Society advocates operation in cases of severe hæmorrhage arising from this cause. Now, it is generally impossible to make certain of the existence of an actual ulcer until an attack of bleeding has occurred, so that the question arises—Are all cases of gastric ulcer henceforth to be considered to belong to the surgical branch? There can be no doubt that most cases of the disease, even when hæmorrhage has taken place, tend to get well without active interference, and we must therefore hesitate before condemning all alike to be operated upon. A certain number of patients, however, at present succumb to repeated attacks of bleeding; and it is in these severe cases that surgical interference is not only justifiable, but called for. Abdominal surgery has now been reduced to such an exact science that the risk of an operation on the stomach is not by any means great.

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**Tubercular or Tuberculous?**

A GOOD deal of diversity exists among writers of medical works as to the use of these words. The better-known form of the adjective was, until recently, "tubercular," and there seems

little reason why it should have been altered. The objection was, however, raised that the word "tubercular" was also applied to certain conditions such as leprosy, in the sense of "nodular," and the form "tuberculous" was accordingly adopted to meet this difficulty. The objection would have been better met by using the word "nodular" in this connotation, and keeping the adjective "tubercular" for things and processes "connected with tuberculosis." The Latin termination "-osus," from which words ending in "-ous" are derived, signifies "full of"; and as we now have the two forms in common use, it may be well to keep the word "tuberculous" for organs or tissues which are infected with tubercle (*e.g.*, a tuberculous joint) and apply the more euphonious form to the majority of cases in which we need a word meaning "connected with tuberculosis," as in the phrases "tubercular meningitis" and "tubercular diathesis."

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**Dr. Schüller's Cancer-Parasites.**

WE have received from Professor Schüller, of Berlin, a letter complaining that, in an article by Dr. Foulerton which appeared in the July and August numbers of THE PRACTITIONER, the researches which he has carried out on the subject of parasites in cancer have been misunderstood or misrepresented. According to Dr. Schüller's letter, the appearances in malignant growths which are described in Dr. Foulerton's article as Schüller's parasites are only "the mostly empty, sometimes folded or lacerated covers" (capsules) of one stage in the development of the organism. The latter exists also in a young and active form. Dr. Schüller claims that he has actually cultivated the parasites, although, owing to their protozoan rather than bacterial nature, it is impossible to obtain pure cultures. The interest attaching to any successful attempts to isolate living organisms from cancers is so great that we can only hope that all due weight will be given to Dr. Schüller's results. He does not, however, in the letter before us claim to have reproduced the disease by inoculation of the cultivations. Up to the present time it seems doubtful whether true carcinoma has ever been so transferred to

previously healthy individuals, although many of the lower animals suffer from the disease as well as mankind.

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**The Critic's Reply.**

In reference to the above, Dr. Foulerton, to whom we sent on Professor Schüller's letter, writes as follows:—

"I need not say that it would be a cause of much regret if it proved true that I had done any injustice in representing Professor Max Schüller's views as to the causation of malignant disease in my paper 'On the Causation of Carcinoma and Sarcoma'; but having had the opportunity of reading Professor Schüller's letter, I am still unconscious of having done any such injustice. I referred briefly to the description of Professor Schüller's 'parasite,' and also to Völcker's statement that he had found bodies closely resembling those 'parasites' in specimens of carcinoma examined, according to Schüller's method, in oil of bergamot which contained cork-cells. I then stated that I myself, in carrying out some experiments in which pieces of carcinomatous tissue were examined after incubation for some weeks in the peritoneal sac of living rabbits, had found bodies which corresponded with the same 'parasite'; and I concluded my reference to Professor Schüller's work by saying: 'But in any case Schüller has not shown that his protozoal 'parasite' has any claims to be considered as the causative agent in carcinoma.'

Professor Schüller complains that I have described as the parasite itself what he had described merely as "the mostly empty, folded, or lacerated capsule of the parasite." On reading my paper over again, I readily acknowledge that, in my desire to make a paper dealing with a large subject as brief as possible, I may have conveyed such an impression. As a matter of fact, the bodies which I found in my experiments, and which I took to be masses of altered blood-pigment, were, by myself, supposed to resemble Professor Schüller's actual "parasite" and not the "capsule." These bodies, which I referred to, were described in my paper as "small round bodies of a light yellowish-brown colour, which sometimes showed in their structure an appearance of radiation, and their edges sometimes presented short, slender, crystalline-

looking, projecting points." Now, in case my own description of Professor Schüller's "parasites" might be thought to be biassed, I may quote a description given by a supporter of his theory, Dr. James Eddy Blake (*New York Medical Journal*, September, 1901): "The grossular (that is to say, the parasite itself) appears as previously described, a more or less spherical body, dark golden-brown or bright golden-yellow in colour, with a greenish tinge and studded with minute bristles. The wall and cell protoplasm can be easily distinguished the one from the other. There is often a nucleus, or two, three, or four equal sized nuclei." This paper of Dr. Eddy's, it may be added, is founded on Professor Schüller's monograph, *Die Parasiten im Krebs und Sarkom des Menschen* (Jena, 1901), and the writer states that he has "followed the German text very closely," while the illustrations are taken, with the author's permission, from the monograph referred to. Further, on turning to my copy of Professor Schüller's monograph, I find an illustration (Tafel I., Fig. 2e) showing certain spherical bodies which, in their coloured representation here given, correspond very closely with what I saw in my sections of carcinoma. Professor Schüller's own description of the figures reads:—Fig. 2. ". . . freie junge Organismen im möglichst natürlicher Farbe und Form, in verschiedener Grösse, lebend . . . ." Professor Schüller demonstrates his parasites in pieces of carcinomatous tissue which have, without any cooling, been transferred from the patient to sterile test-tubes and incubated at blood-heat; the bodies that I observed were seen in pieces of carcinomatous tumours which had been transferred under exactly the same conditions from the patient to the peritoneal sac of rabbits, and incubated there instead of in a test-tube. I think, therefore, that I am justified in assuming that Professor Schüller and myself have independently observed the same bodies.

The question at issue of course is whether Professor Schüller is right, whether I am right, or whether either of us is right, in the interpretation of our respective observations. Personally I do not think that Professor Schüller has either proved that these bodies are protozoa, or that—whatever their nature may be—they are the cause of carcinoma or sarcoma."

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**The Cause of Sleeping Sickness.**

THE announcement recently made by Dr. Manson that the causal agent in the disease known as "Sleeping Sickness" or "African Lethargy" has at last been discovered is a fact of the first importance. This terrible disease, which affects the negro population in certain parts of Africa, has lately seemed to be enlarging its borders, and spreading to regions which had been previously immune from it. The mortality caused by it among the natives has been enormous, whole villages being depopulated by the scourge. It is true that it is not the same thing to find the causal agent and to discover a cure for the malady, but the first step is to ascertain the pathology of the condition. The remedy will come later either in the form of a drug or, more likely, of a protective or curative serum.

The morbid anatomy of this strange disease had been already ascertained by Dr. F. W. Mott, F.R.S., who found, in two patients who died at Charing Cross Hospital, that an intense inflammation existed in the substance of the brain, the vessels being everywhere surrounded by masses of migratory leucocytes. This appearance suggested very strongly the existence of an infective cause. The enlargement of the lymphatic glands, which also occurs, pointed in the same direction. The clinical symptoms consist of a gradually increasing lethargy, the patients not seeming to suffer any pain, but appearing miserable, and resenting any attempt to arouse them. Great wasting latterly occurs, and death takes place by progressive asthenia.

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**Examination of the Blood.**

THE paper by Dr. French in our present issue deals with a method of diagnosis which has recently received a considerable amount of attention, viz., examination of the blood. It has long been known that in the different forms of anæmia an alteration occurs in the red corpuscles and the hæmoglobin, but the value of the blood as a diagnostic medium went little further. We now recognise that not only the erythrocytes, as the red corpuscles are conveniently termed, offer aid in diagnosis, but that the leucocytes also, and even the serum, may give us

valuable information. In many cases, for example, the existence of deep-seated suppuration in the abdomen is very difficult to recognise, the symptom being very obscure and misleading. In such instances an enumeration of the leucocytes in the blood may be of marked assistance, since in all cases where pus is forming their numbers are considerably increased.

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**Enteric Fever and the Blood.**

FEW diseases are more difficult to recognise than enteric fever, and here the blood offers especial help to the scientific observer in more than one direction. Thus, in the first place, the well-known serum-reaction — generally called Widal's reaction, though it seems doubtful whether this author was in any real sense the discoverer of the test—affords positive help in the great majority of cases, after the first few days. In the second place the number of leucocytes is diminished rather than increased—a point which at once puts out of court the obscure suppurative conditions, such as masked perityphlitis or pyosalpinx, which may simulate enteric fever, as well as most infective diseases, in nearly all of which there is a certain degree of leucocytosis. A distinction may thus be made between abnormal cases of influenza and rheumatism on the one hand and enteric fever on the other.

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**Eosinophilia and Animal Parasites.**

THE discovery has also been made that many diseases due to animal parasites are accompanied by a great increase in the number of leucocytes of the kind which contains in its protoplasm granules which are stained deeply by eosin. The condition in which the blood contains these cells in excess is called "eosinophilia." This occurs in cases of infection with the Bilharzia hæmatobia and with the Filaria sanguinis hominis, as well as with the Trichina spiralis. The two former diseases are not uncommon in the tropics, and many persons come home to this country suffering from the conditions to which they give rise. It is well, therefore, to be on the look-out for them, and to recognise the aid which a study of the blood can afford in detecting them. The same condition of eosinophilia

is seen in trichinosis, a malady which is fortunately rare in this country, but which is important in that the symptoms to which it gives rise closely resemble those of irritant poisoning. Here too the blood may indicate the nature of the affection with which we are dealing.

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**Aneurysm of the Aorta and its Symptoms.**

A SIGN of aneurysm which is not mentioned in the text-books is pointed out by Dorendorf in the *Deutsche Medicinische Wochenschrift* (July 10, 1902). This consists in an obliteration of the left supraclavicular fossa, along with marked congestion of the left external jugular vein. Dorendorf observed the condition in all of eight cases which he examined. Another sign of the disease is said to consist in a rhythmical oscillation of the head, which occurs in this affection and in aortic disease to a visible degree, though, according to Frenkel and Lafon, who investigated the point, the movement is met with also in a minor degree in normal persons. The two foregoing symptoms can hardly be reckoned among the important signs of aneurysm, but the disease is liable to be so latent in many cases that any additional aids to diagnosis are to be welcomed.

Two different explanations have recently been given of the disturbance of the pupil which occurs in these cases. On the one hand, Drs. Wall and Walker, in the *Lancet* (July 12, 1902), attribute the irregularity of the pupils to differences of blood-pressure on the two sides, a contraction of the pupil occurring if the pressure rises. They maintain that in cases which they have examined, whenever one pupil was larger than the other, the corresponding radial pulse was also smaller than that on the opposite side. On the other hand, Dr. Chaillons, in the *Revue d'Oculistique* for the same month, attributes the inequalities of the pupils to syphilis, which is known to act as a powerful cause of aneurysm, and which is also the usual, if not the invariable, antecedent of the "Argyll-Robertson" pupil.

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**The True Object of Research.**

THE tired worker at some scientific problem may at times wonder what is the true object of all this painful and laborious investigation, and whether it is not indeed a case that "all is vanity." Now we are enlightened as to the real inwardness of things by the *Pharmaceutical Journal*,[1] which speaks of "the true final object of all research, namely, the advancement of trade." This is carrying the principles of political economy to extremes. Knowledge is of no account, and material benefits in the shape of new remedies for disease are side issues. We can now, with renewed enthusiasm, hunt for the elusive parasite of cancer, and seek for means to combat the ravages of tuberculosis. Yet if we solve those problems, our true reward will be wanting, unless we find a resulting increase in the Revenue returns.

[1] December 20, 1902, p. 673.

## Practical Notes.

TREATMENT OF THE MORPHINE-HABIT.—Dr. Mattison, of Brooklyn, gives the following advice as to the treatment of this affection. The drug should be gradually withdrawn, as a sudden cessation of the accustomed narcotic causes acute suffering, and is actually dangerous as well as unnecessary. If the patient has been in the habit of using the drug hypodermically, it should be administered in the same or slightly smaller doses by the mouth to start with. At the same time bromide of sodium is given twice a day, beginning with 10 grains, at 10 a.m. and 10 p.m., and gradually increased by 5 grains each dose to the amount found needful. Towards the end of the period of withdrawal codeine is used to tide over any difficulties: it is administered in the form of the phosphate, hypodermically, in doses of 1 to 2 grains every 3 to 5 hours. For the sleeplessness that is often most distressing, trional is the best remedy (20 to 30 grains); sometimes Cannabis indica is of use. Neuralgia is best met by the use of electricity or the ether-spray. Another spray which may be of service is composed of menthol, 1 part; chloroform, 10 parts; and ether, 15 parts. Internally, phenacetin or phenalgin may give relief. Collapse is seldom or never met with under this method of treatment; but if it occur, a full dose of morphia must be at once administered. The "craving" sensation when it is experienced may be met by the use of nitroglycerine ($\frac{1}{100}$ grain in tablet-form); and the administration of bicarbonate of sodium in doses of 30 to 60 grains is also to be commended. The writer cannot too strongly condemn the sudden withdrawal of morphine by way of treatment, which he characterises as "brutal, utterly unworthy the healing art."

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SPRAINS AND THEIR TREATMENT. — Dr. W. Gray (*Caledonian Medical Journal*, January 1903, p. 314) points out that there are two varieties of pain in connection with sprains — the primary pain, due to sudden and forcible

stretching of the ligaments at the moment of injury, which soon passes off, and is followed by an interval of ease, lasting for two to four hours; and the secondary pain produced later on by effusion into the capsule of the joint, and resulting tension. Treatment of a sprain, if the patient be seen directly after the injury, may consist in the application of cold water or evaporating lotion. The best results are obtained by the application after this or at once of elastic pressure, by means of several thick layers of absorbent wool and a bandage without reverses. By this method the amount of effusion and stiffness are limited, and the secondary pain is rendered less. To be of use the elastic pressure must be applied before effusion has occurred. The skin should first be dusted with some antiseptic dusting powder, and absolute rest should be enforced at first. After the swelling has subsided, tender points may remain; a blister over such points may give much relief. If much stiffness is left after all swelling has gone, there are probably adhesions in the joint, and these must be forcibly broken down under an anæsthetic. It is wise to continue friction and passive movements after the joint is apparently quite well. Cold douching may be useful in these late stages to restore the use of the muscles.

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SANTONIN FOR "LIGHTNING PAINS."—Courbemale and De Chabert (*L'Écho Medical du Nord*, June 29, 1902) report favourably on the use of santonin in the "lightning-pains" of tabes dorsalis. Given in doses of 5 centigrams ($\frac{3}{4}$ grain) three times a day, it is effectual in about half the cases experimented upon, not only lessening the pains, but also preventing their subsequent occurrence. The drug seems, however, to have a tendency to provoke gastric crises, so that caution is necessary in its administration. Any signs of the characteristic yellow vision must be the signal for stopping its use.

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TREATMENT OF HÆMATOMATA WITH OLIVE OIL.—Dr. Camescasse (*Revue de Thérapeutique*, December 1, 1902, p. 302) advises the application of olive oil in all cases of

contusions and hæmatomata. No rubbing in is necessary—it is indeed painful and therefore to be avoided—but the oil is simply sprinkled on or applied on lint. If the skin is broken a previous cleansing with some antiseptic is advisable. The mode of action of the remedy is not clear, but the rapidity and effectiveness of its action are said to be remarkable. A black-eye thus treated disappeared so quickly and completely that the victim was inclined to complain on the ground that he had no visible injury to show to the police.

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TREATMENT OF TYPHOID FEVER.—In an address on this subject, delivered before the North London Medico-Chirurgical Society, Dr. H. D. Rolleston alludes to the question of the advisability of starving the patient, and thus reverting to the ancient method of treatment. He quotes the cases of some soldiers who suffered from typhoid fever during one of the sieges in the South African war. Provisions were scarce, and the patients lived for some days on little but water. They did exceptionally well on this diet during the fever, but during convalescence they suffered from lack of sufficient nourishment. Typhoid patients appear to do well on little but water, with or without a small quantity of alcohol. With regard to the use of this drug for heart-failure, Dr. Rolleston speaks dubiously. He tends to prefer hypodermic doses of strychnine. For intestinal antisepsis he gives the palm to Liquor hydrargyri perchloridi in half-drachm doses. With respect to the anti-typhoid inoculations as practised by Wright, the data do not admit of a certain conclusion being reached, but Dr. Rolleston's own observations tended to show that infection did not take place within six months of the inoculation, which therefore seemed to confer temporary immunity.

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ENURESIS IN CHILDREN.—Dr. H. B. Sheffield (*The Post-Graduate*, December, 1902, p. 1413) points out that of the two varieties of enuresis—that by day and that by night—the former scarcely ever occurs in children. The latter form is, on the other hand, exceedingly common. It may be either functional or organic. Functional causes may either consist in a

spasmodic condition of the detrusor muscle, or in atony of the sphincter, one state being found in nervous, irritable children, the other in those who are in feeble general health. A long list of organic conditions may give rise to the malady, among them organic disease of the spinal cord, cystitis, phimosis in the male, and hypertrophy of the clitoris in the female, masturbation, undescended testicle, hernia, worms, vesical and renal calculi, tumours in the bladder, excessive quantity of lithates or phosphates, constipation and accumulation of fæces, epi- or hypo-spadias, fissure *in ano*, vulvo-vaginitis, gonorrhœa, diabetes mellitus, and simple or gonorrhœal proctitis. Needless to say, in such cases the treatment consists in removal of the organic condition. In the absence of such organic causes, much may be done by good advice. The patient must be instructed, if old enough, not to refrain from micturition when the desire occurs; and small children should be taught to pass water every three hours, in order to avoid any undue distension of the bladder. The patient must not be allowed to sleep on his back, and it may be of advantage to raise the foot of the bed. In atonic cases attention must be paid to the general health by means of tonics, change of air, &c. Sheffield recommends the use of the following mixture :—

℞ Ext. ergotæ fl. - - - - ʒiii.
Ext. rhus. tox. fl. - - - ʒi.

M Sig. Five to ten drops every four to six hours to a child six years old.

In cases in which there is hyperæsthesia of the neck of the bladder, the following mixture may be used :—

℞ Ext. hyoscyami - - - - ʒss.
Natrii bromidi - - - ʒi.
Aquæ anisi - - - - ʒi.
Syrup. simplicis, q.s. ad. - - ʒii.

M Sig. One teaspoonful every four to six hours for a child six years old.

Sinapisms over the lumbo-sacral region are often useful, and, as a last resource, gradual dilatation of the posterior urethral canal is sometimes successful.

# THE PRACTITIONER.

**MARCH, 1903.**


## ON THE MODE OF PRODUCTION OF FRACTURES OF THE LOWER EXTREMITY BY INDIRECT VIOLENCE.


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[With Plates XXIII.–XXXIX.]

WHEN operating upon fractures of the lower extremity produced by indirect violence, I have often experienced great difficulty in explaining sufficiently clearly to those looking on the mode in which these fractures are brought about. I propose to do so here in detail.

In order to obtain a thorough grasp of the causation of these injuries, it is necessary in the first instance to call attention to some important points in the anatomy and physiology of the foot and ankle. The movement of the ankle-joint takes place only around a transverse axis. The movement around a vertical axis in complete extension, which was described by anatomists as occurring in this joint—the narrow portion of the upper articular surface of the astragalus being supposed to be able to move freely in a broader interval between the malleoli—is absolutely without foundation and is non-existent. I will quote from as excellent and recent a students' text-book as *Gray's Anatomy*, 1887, in order to remind the reader of the older view.

"A certain amount of lateral motion is permitted when the foot is in the extended position. This is in consequence of the shape of the articular surface of the astragalus, which is considerably wider in front than behind, and of the tibio-fibular mortise which is also broader in front than behind; hence in complete extension the narrowest part of the

astragalus is lodged in the widest part of the tibio-fibular arch, and therefore a certain amount of lateral movement is possible." That this is still supposed by many to be the correct teaching is shown by the following under the heading of "Movements" in *Morris's Anatomy*, 1902:—"This being a true hinge-joint, flexion and extension are the only movements of which it is capable, there being no lateral motion, except in extreme extension, when the narrowest part of the astragalus is thrust forward into the widest part of the tibio-fibular arch." The fallacy of this description I dealt with fully in the *Journal of Anatomy and Physiology*, April, 1888, "Anatomy and Physiology of the Ankle-joint." Like many other incorrect descriptions of the functions of joints, &c., it has clearly been evolved out of the inner consciousness of someone, and reproduced in slightly varying language in almost every succeeding English work on the subject. The movements of extreme flexion and extreme extension are limited by the impact of the margins of the tibial facet upon the surfaces of the astragalus immediately in front of and behind the upper articular surface. In many bodies these facets on the tibia and astragalus are very distinct and are covered

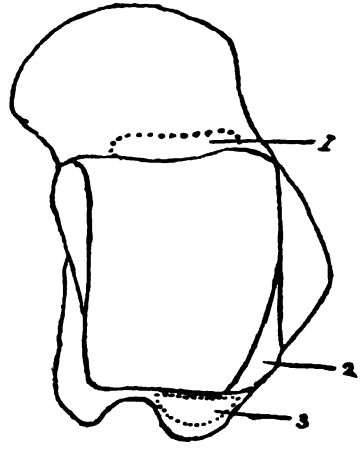


Fig. 1.

with articular cartilage. Those on the astragalus are represented in Fig. 1. Of the two on the tibia the anterior is by far the better marked. In a labourer whose occupation

has entailed his habitually carrying loads up ladders this facet is most distinct and defined.

The mechanics of the several bearings or joints of the body are so arranged, if it is possible, that, as in this case, extreme movements are limited by the impact of bone against bone. Besides affording a much greater security, it reduces the expenditure of muscular energy considerably. In the hip-joint, for instance, flexion is limited by the impact of the neck of the femur against the acetabular margin,[1] the point of impact varying with the degree of adduction or abduction of this joint; in the shoulder-joint flexion is limited, and the scapula fixed, by the impact of the coracoid process against the under surface of the clavicle[2]; in the elbow extension and flexion are both limited by the impact of bone against bone; and in the knee extension is limited in the same manner. Indeed, in the labourer the tendency is to obtain bony limits in joints in which such do not exist in the so-called normal subject. Those who are interested in the many extraordinary instances of the formation of abnormal limitations in labourers may refer to a paper in the *Journal of Anatomy and Physiology*, April, 1887, entitled "A remarkable Example of the manner in which Pressure Changes in the Skeleton may reveal the Labour History of the Individual." Many illustrations of these joint-changes are also contained in a paper in THE PRACTITIONER, May, 1900, "Mechanical or Traumatic Arthritis."

In complete flexion and complete extension there is no possibility of the astragalus rotating at all around a vertical axis, as any such movement is rendered impossible by the resistance offered by the anterior or posterior fasciculi of the internal and external lateral ligaments, which are stretched to the utmost in these positions. Though in the extremes of flexion and extension there is no appreciable rotation of the fibula, yet when the foot occupies a position intermediate between that of complete extension and flexion of the ankle-joint, and the anterior and posterior fasciculi of the lateral ligaments are not very tense, forcible abduction of the foot

[1] "Operative Treatment of Simple Fractures," *Lancet*, May 26, 1900, page 1490.

[2] "Mode of Fixation of the Scapula, suggested by the Movements of that Bone in Extreme Flexion of the Shoulder-joint; its bearing upon Fracture of the Coracoid Process." *Brit. Med. Journ.*, May 19, 1888.

produces a slight rotation of the fibula upon its vertical axis. The forces which produce this rotation are two, namely, the impact of the front portion of the facet on the outer surface of the astragalus upon the anterior margin of the corresponding facet on the inner surface of the external malleolus, and the very considerable strain exerted upon the inner aspect of the posterior part of the lower end of the fibula by the powerful posterior fasciculus of the external lateral ligament. The fibula is also forced a little upwards. This is associated with a relaxation of the inferior interosseous tibio-fibular ligament and of the interosseous membrane, permitting of a slight separation of these two bones. The hold which is exerted upon the astragalus by the two malleoli is relaxed in consequence. The external malleolus is displaced backwards, and occupies a position in a vertical transverse plane behind and above the normal. It is this displacement which produces the overlapping of the fibular fragments in Pott's fracture. In adduction of the foot the fibula is rotated on its own axis in a vertical direction to a much less extent, owing to the strain exerted along the anterior fasciculus of the external lateral ligament in a direction which is downwards, forwards, and inwards. This strain pulls the lower end of the fibula forwards and downwards, so as to alter its relationship with the vertical transverse plane in which the internal malleolus lies. This displacement of the fibula causes its very forcible approximation to the tibia, owing to the resulting increased obliquity of the interosseous membrane and ligament, so that the astragalus is held in the grip of the malleoli which is as large and as secure as possible.

For all practical purposes, then, the ankle-joint may be regarded as a fairly perfect hinge-joint, in which any very slight rotation of the astragalus outwards around a vertical axis in abduction of the foot is associated with a torsion of the lower end of the fibula on its long axis by force acting at a great mechanical advantage; while in adduction, what torsion there is, is trivial in range and in the reverse direction, and is exerted with very much less force.

The movement of adduction is produced chiefly by the action of the tibialis posticus muscle, which by raising the tuberosity of the scaphoid winds up the spiral calcaneo-scaphoid

ligament, narrowing the angular interval between the sustentaculum tali and the scaphoid, and displacing the head of the astragalus outwards on to the os calcis.

Abduction of the foot, which is usually a passive movement when associated with fracture, results from the relaxation of the tibialis posticus, which allows the tuberosity of the scaphoid to drop, the calcaneo-scaphoid capsule to unwind, and the head of the astragalus to pass inwards into the angular interval between the sustentaculum tali and scaphoid, now increased to its extreme limit. I need hardly say that the usual comparison of the mechanics of the bones of the foot to arches is merely imaginary ; no such arrangement exists.

All this I described fully in the *Guy's Hospital Reports*, 1886, page 252, yet I find in the students' text-books of the day the same incomprehensible descriptions of the movements of the joints comprising the foot, and of the mechanics of the part, that I plodded hopelessly through as a student. Wherever the anatomist is clearly at fault, he supplements his insufficiency with "surgical anatomy," which shares the characteristics of the "movements."

If the foot be adducted by a force greater than it is able to bear, the head of the astragalus tends to become dislocated outwards. If, on the contrary, the foot be abducted excessively, the tendency to rotation of the fibula upon its own axis may be sufficient to break that bone ; while if abduction be carried still further the astragalus and the rest of the foot are displaced backwards upon the tibia, when the internal lateral ligament or the internal malleolus may yield also. The leverage which is exerted by the foot upon the ankle in abduction is very much greater than it is in adduction, for not only does the large broad grip of the ground by the sole of the abducted foot afford a much greater resistance than the narrow outer margin of the foot in extreme adduction, but the length of the arm of the lever in the former corresponds with the interval between the ankle-joint and the ball of the great toe in the foot elongated to its extreme limit, while in the latter the interval is between the ankle and the outer surface of the fifth metatarsal bone in the foot foreshortened as much as possible.

In consequence of excessive forcible abduction a vertical or spiral fracture of the fibula, with a displacement of the whole

foot outwards and backwards upon the tibia, with or without damage to the internal malleolus or internal lateral ligament, may ensue. Fig. 2 represents the common type of Pott's fracture, and it also gives one a very good idea of the disability which results from the ordinary treatment, as in none of the photographs which I have seen taken after convalescence under these circumstances did the displacement of the fragments appear to have been altered by the measures adopted. After a time, especially in the young subject, the irregularity in outline is reduced, but the mechanism of the joint is altered permanently, in the manner described and fully illustrated in THE PRACTITIONER, September, 1902, in a paper entitled "Some Points in the Treatment of Fractures."

Except under such exceptional circumstances as disease involving added risks, the surgeon has no possible excuse for not interfering here, as the disability resulting from any treatment other than operative is generally recognised; and a very moderate amount of skill, and a reasonable familiarity with aseptic surgery, should absolutely guarantee a restoration of the normal use of the part, which should be as perfect anatomically and functionally as before the accident. I could understand a nervous operator hesitating to operate on a fractured femur, but not on such a simple, but often more disastrously disabling, fracture as this.

Fig. 3 shows a Pott's fracture seen from before backwards.

Fig. 4 represents a case of Pott's fracture some time after the receipt of the injury, and illustrates the less common variety of this accident, namely, fracture of the fibula at a distance from the malleolus. This case was treated by manipulation and splints, early movements being adopted. Owing to the complete disability which resulted, at the patient's urgent request I performed the operation the results of which are shown in Fig. 5. It is not quite as good as if the bones had been wired in the first instance; still, functionally, the patient was enormously benefited, though not by any means completely freed of his disability.

There is a remarkable similarity in the results of excessive abduction of the foot, the conditions varying with the degrees of force exerted. Fig. 6 represents the fracture in its worst form with the displacement in a marked degree. It will

PLATE XXIII.

**Fig. 2** *shows the most common type of Pott's fracture of moderate severity, seen laterally.*

## Plate XXIV.

Fig. 3 *represents a radiograph of the common variety of Pott's fracture taken from before backwards. It also illustrates the necessity of taking skiagraphs of fractures in two planes crossing one another at right angles in order to ascertain the degree and character of the displacement of the fragments on one another.*

PLATE XXV.

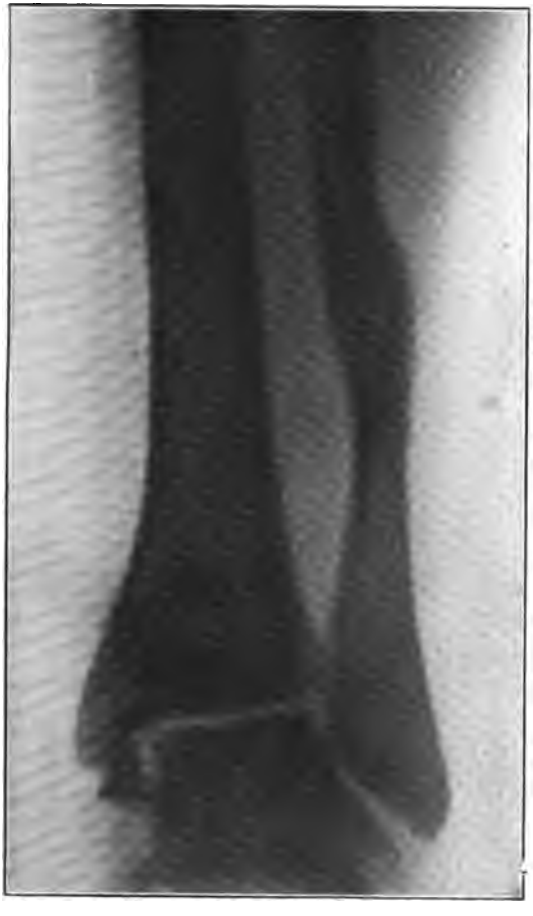

Fig. 4 *shows the conditions present in a less common variety of Pott's fracture. The skiagraph was taken long after the receipt of the injury. The man had been completely incapacitated, and begged that something should be done to remedy his pain and disability, failing which he wished the foot amputated.*

## PLATE XXVI.

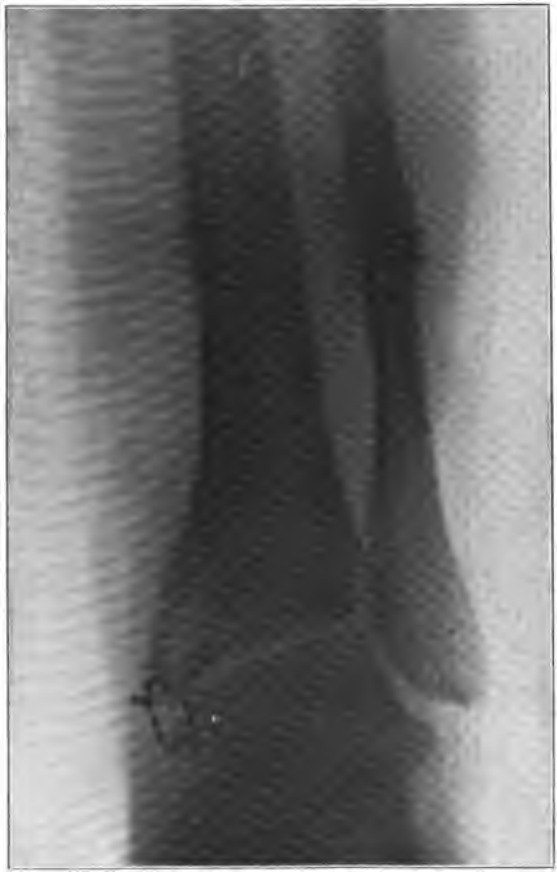

Fig. 5 *represents the result of operative interference in the condition shown in* Fig. 4.

Fig. 6 *shows the backward displacement of the foot in a bad case of Pott's fracture, the tibial facet on the astragalus being separated by a considerable interval from the corresponding surface on the tibia. The fibula was broken spirally, and the fragments were firmly united by bone, so that their axes included an angle of considerable size.*

## Plate XXVIII.

Fig. 7 *shows the result of the operation in the case of Pott's fracture illustrated by* Fig. 2. *The fragments of the fibula have been separated from one another, and have been fixed in accurate apposition to one another, while the lower fragment has been secured to the tibia, replaced in its normal relationship to the astragalus, by a screw, which is seen to pass downwards and inward through three bones.*

interest those surgeons who believe that they are able to treat such fractures successfully without operation, to know that the patient whose leg is here represented was in an excellent social position and was able to command, and did obtain, the benefit of surgical skill of a high order. This skiagraph was taken many months after the receipt of the injury, when it appeared that she must continue to be a cripple for the rest of her life. By means of free incisions, and by removing from the surfaces of the fibular fragments the callus which had formed, these were retained in accurate apposition, and the tibia in its normal relationship to the astragalus, by a long steel screw which traversed the lower fragment of the fibula and the lower end of the tibia. Fig. 7 represents the condition after she had recovered completely. Subsequently, to avoid any possible risk of the screw giving trouble, it being no longer of any service, I removed it through a small opening. She made an excellent recovery, and is able to walk comfortably for considerable distances, Fortunately this patient was young and vigorous. My experience in attempting to remedy the very unsatisfactory results of the usual mode of treatment of these fractures after the lapse of much time has not been as successful as I should like, especially if the subject is past middle life. However, one is consoled by the knowledge that operative procedures at the time of the injury are uniformly completely successful and altogether obviate any disability whatever, and is led to hope that an increasingly frequent recourse to operation at the time the injury is sustained will reduce the very large number of hopelessly unsatisfactory results, which require some form of remedial surgical treatment.

In some cases, owing to the fracture passing through the ligament, there is no displacement of the lower fragment, and therefore no condition calling for operative interference. Indeed, under these circumstances the fracture often cannot be recognised without the aid of the X-rays.

As one would expect, the vast majority of these fractures are spiral or almost vertical, the latter being the more common, since the fracture traverses in the majority of cases some part of the malleolus. Careful consideration of the anatomy of the part, and of the mode of causation of this fracture, and experiments

at manipulation of the foot made at the time of operation, when the seat of fracture is fully and freely exposed, show how impossible it is to exert force upon the lower fragment of the fibula in a direction exactly the reverse of that by which the fracture was produced, and so effect accurate apposition of the fragments. This explains the well-known want of success that surgeons have always experienced in obtaining anything approaching a perfect result in this form of fracture. Indeed in this fracture, as in those in the vicinity of other joints, their constantly-repeated failures to restore to the parts their normal anatomy and physiology have driven them to attempt to effect a miserable and thoroughly unscientific compromise by commencing active and passive movements within a very short period of the receipt of the injury which caused the fracture, a method which cannot be too strongly condemned in the present day by competent operators, especially in patients who are no longer young or vigorous. The disabling mechanical conditions, which I called "Mechanical or Traumatic Arthritis," I summarised and illustrated recently in THE PRACTITIONER, May, 1900, under that heading. The importance to the surgeon of a thorough familiarity with the changes which develop in joints in the several decades of life, in consequence of such alterations in the lines of pressure through them as result from fracture of the bones taking part in their formation, cannot possibly be exaggerated. It was because surgeons were ignorant of these changes that they were, and may still be, satisfied to continue the barbarous, indiscriminate treatment of fractures by means of manipulation, splints, massage, &c. A more careful study, however, of the mechanics of the normal skeleton, and of the conditions which result from any alteration in its form produced by injury, together with a larger experience in the application of the principles of aseptic surgery, will probably soon remove their conservatism in this direction. In reference to the question of operations on fractures, &c., by aseptic methods, one could not but be surprised at certain apparent misstatements made in the "Lister Jubilee number" of the *British Medical Journal*. As an example I have extracted from some remarks by a very distinguished surgeon the following from page 1821 of that number:—

"Modern surgeons, instead of moderating those precautions

which might be moderated, introduce new and incredible precautions incompatible with regular practice.

"And yet have they altered the results of surgery? Certainly they have caused it to lose its safety. That which Lister assured—the mathematical safety of surgical work done in accordance with the precautions indicated, applicable under all circumstances, in all places, with all patients, and without lengthy preparation—that security has disappeared. Doubtless the surgeon who devotes so much attention and so large an expenditure to this new task has not gone back to the murderous surgery of thirty years ago, to the customary mortality from erysipelas and purulent infection. But look closely at his surgery. You will see how often little accidents occur, how often breaking down of primary union and secondary suppuration are met with. Even examine the statistics and you will see how many disasters occur from time to time, testifying to the inadequacy of their laborious precautions.

"Let us take, for example, the surgery of the joints, so easily infected during an operation. We shall see that it has been sown with disasters which antisepsis averted. Now this surgery of the joints was born out of antisepsis, and its results are sufficient to demonstrate the absolute powerlessness of the surgery called aseptic. The most simple of all operations upon the joints, the suturing of the fractured patella—that marvellous conception of Lister's, first performed by Cameron at Glasgow—remains the property of surgeons faithful to antiseptic methods. It holds out to the others the promise of the disasters which they deserve to encounter. Aseptic surgery, powerless to ensure safety, is reduced to condemn it as a bad operation."

I need not say that I do not for one instant intend to depreciate Lister's magnificent discovery, as indeed "aseptic surgery" may truly be regarded as his grandchild, while antiseptic surgery bears a nearer relationship, but *I would assert that in my experience the above remarks concerning aseptic surgery are absolutely false and without any foundation whatever.* In trying to belittle the offspring, the writer is casting a slur on its parentage; and to both proceedings I would object most strongly. Lister's marvellous

work cannot be finite, but must progress and continue to increase in usefulness. I believe that in the future we shall see his principles applied in a degree of simplicity and of perfection of which we have practically little knowledge at the present time. It is unfortunately much more easy to absorb details than to grasp a general principle, and the difficulty experienced would often appear to vary with the simplicity of the law involved.

The next fracture we will consider is that of the tibia and fibula produced by indirect violence. It is brought about by the forcible rotation inwards of the leg upon the abducted foot, the superjacent weight of the trunk being transmitted vertically through the limb. The tibia breaks first, since it sustains by far the largest part of the strain. If sufficient force be exerted, the fibula then yields also, usually at a much higher level. The continued transmission of the force applied vertically through the bones results in the upper fragment being driven forwards, backwards, and inwards, and the lower upwards, backwards, and outwards, into the surrounding soft parts, the "chisel" shape of each fragment increasing the interval or separation between them in proportion to the degree of overlapping. The form of the fracture of the tibia is always spiral in character, each fragment ending in a spike-like extremity, and their displacement is practically always identical. That of the fibula is very often spiral also, but not with the same uniformity as in the case of the tibia.

Figs. 8 and 9 illustrate this spiral fracture of the tibia alone. Though the fracture has taken place at a different level, the character of the fracture and the displacement of the fragments are practically identical in both specimens. As in all the other skiagraphs, these represent the fragments in their best possible relationships to one another, and they show therefore the alteration in the form of the bone, and the mechanics of the joints influenced by this, that of necessity result from the usual ineffectual treatment by manipulation and splints.

Figs. 10 and 11 illustrate cases of fracture of both the tibia and fibula by indirect violence. The line of fracture and the displacement are identical in both cases, and the result of treatment also equally unsatisfactory. Fig. 12 represents

## Plate XXIX.

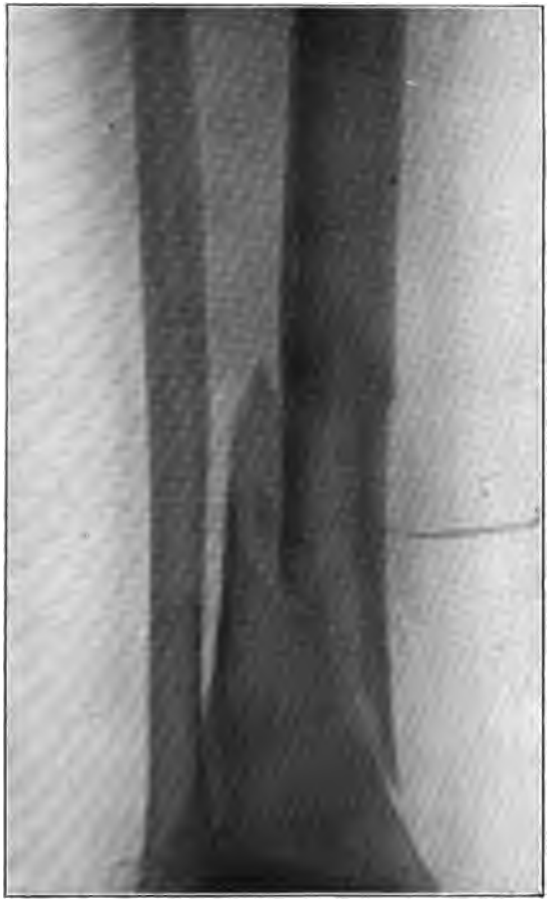

Fig. 8 *represents a skiagraph of a very common variety of spiral fracture of the tibia taken from before backwards. The displacement of the fragments is constant, the upper passing downwards, forwards, and inwards, the lower upwards, backwards, and outwards. The knowledge of the character of the displacement is of great importance to the surgeon, in that it simplifies considerably the details and severity of the operation, and secures a perfect result. This skiagraph shows the degree of displacement of the fragments in a vertical antero-posterior plane, as well as the extent of their overlapping.*

## Plate XXX.

Fig. 9 *shows a case similar to that illustrated in* Fig. 8 *seen laterally. This represents very well the degree of overlapping of the fragments in an antero-posterior plane with the extent to which they overlap.*

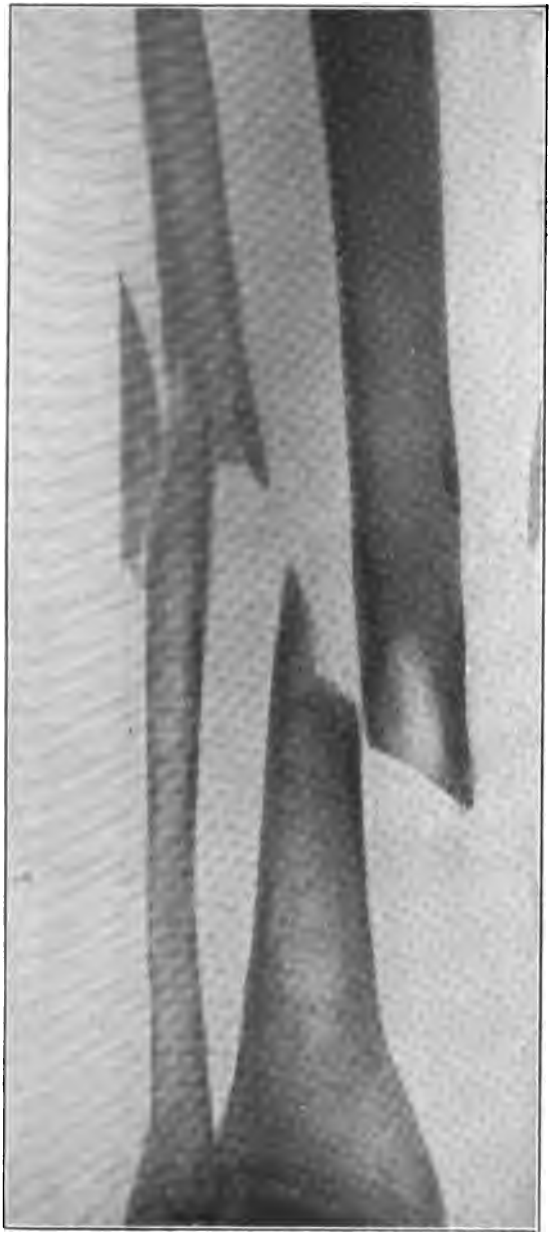

Fig. 10 *represents the displacement of fragments in a case of spiral fracture of the tibia and fibula. It is practically identical with that shown in* Figs. 8 *and* 9.

## PLATE XXXII.

**Fig. 11** *shows the displacement in a spiral fracture of the tibia and fibula.*

## Plate XXXIII.

Fig. 12 *is a skiagraph of a spiral fracture of the fibula which was associated with the ordinary spiral fracture of the tibia in its lower third.*

## Plate XXXIV.

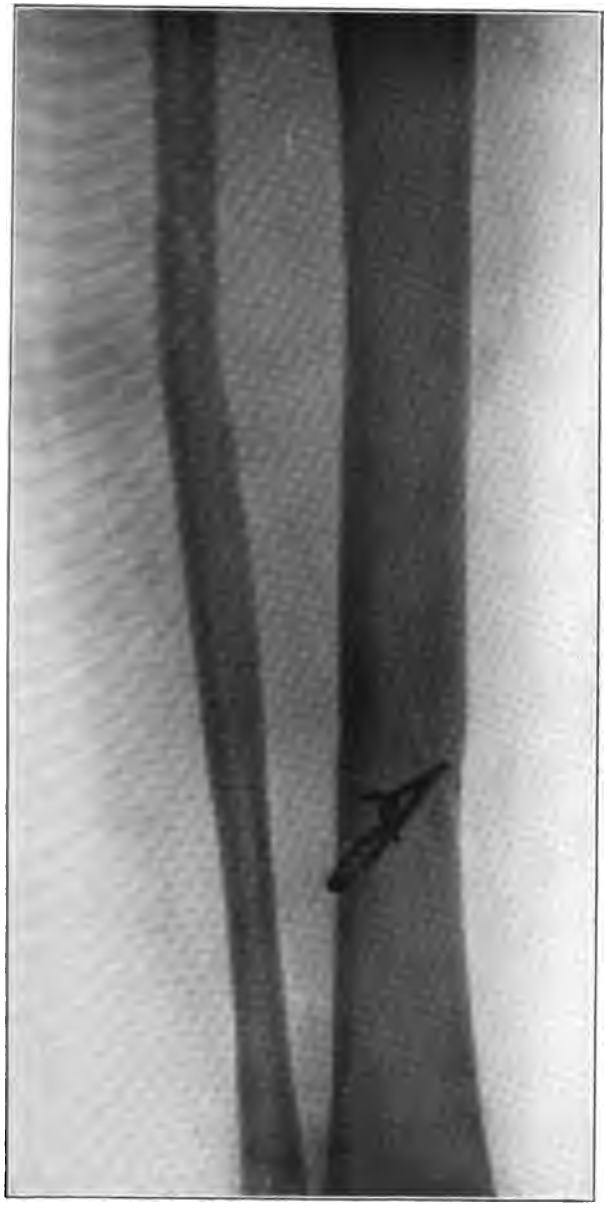

Fig. 13 *is a skiagraph of a spiral fracture of the tibia and fibula treated by operation shortly after the receipt of the injury. The fracture of the fibula was higher, and union is so good that it is difficult to detect its seat.*

## Plate XXXV.

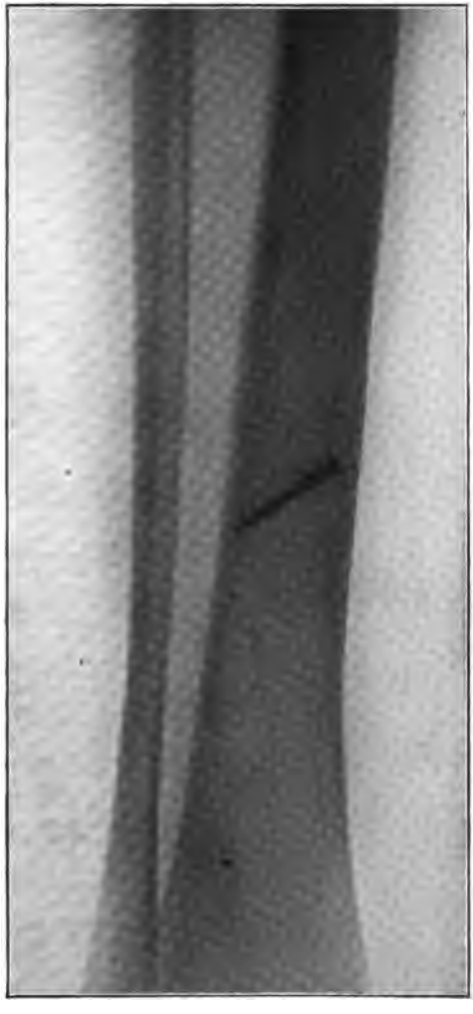

Fig. 14 *represents a spiral fracture of the tibia in which the fragments were accurately united by a screw. The fracture of the fibula is not seen in this illustration, as it was in the upper part of the bone.*

a spiral fracture of the fibula which was associated with a spiral fracture of the tibia in its lower third of a type identical with those already illustrated.

*In the one case excessive abduction of the foot* results in a torsion of the fibula and its fracture, in the other case *excessive rotation inwards of the leg upon the abducted foot* results in a spiral fracture of the tibia, which may or may not be associated with a fracture of the fibula at a higher level.

Figs. 13 and 14 illustrate the only scientific method of treatment of these fractures. In the former the fragments are held in perfect apposition by wire, and in the latter by a screw. In both cases the functions of the bones and joints were restored to the normal, and the patient suffered no permanent harm from injury. These results form a striking contrast to those obtained by the usual modes of treatment, if that term can be fairly applied to them.

Spiral fracture of the femur is brought about in a similar manner, viz., by the transmission of an excessive vertical force through the lower extremity, which is fixed in a position of extreme external rotation at the hip-joint by means of the enormously powerful anterior portion of the capsule, upon an abducted foot. Here we have two forces acting in opposite directions upon the axis of the femur; one extends from the front of the great toe to the axis of the tibia, and the other from the axis of the shaft of the femur through the neck of the femur and pelvis. Both form levers, the extremities of which move along arcs in opposite directions. When the knee is flexed, force may be exerted through the lower leg as the arm of the lever, the length of which varies with the degree of flexion and the interval between the point of application of the force to it, and the long axis of the femur. Again, the femur may be subjected to torsion in a reverse direction. The femur may be fixed on the pelvis in a position of flexion, accompanied or not by abduction, in the manner I have described,[1] the neck of the femur becoming impacted against the margin of the acetabulum. The leverage in the case of the abducted foot is less, but when the knee is flexed the leverage becomes the same as in rotation in a reverse direction. In this case there is a reasonable

[1] "Operative Treatment of Simple Fractures, Cleft Palate, &c," page 180, Medical Publishing Company; and in previous papers.

likelihood of the head of the bone becoming displaced and forming a dislocation, which cannot occur when the femur is rotated outwards; or of the neck of the bone yielding at the point of impact, and intra-capsular fracture resulting. The form of fracture of the femur produced under these circumstances is always spiral in character, and takes place within a very limited portion of the shaft.

Here, as in the previous case, the spike-like extremity of the upper fragment is driven by its chisel-shaped form downwards, forwards, and inwards, while the upper spike of the lower fragment is for the same reason driven upwards, backwards, and outwards into the substance of the surrounding muscles. The chisel-shaped form of the fragments ensures their mutual separation in a degree proportionate to their overlapping, which depends on the amount of the force used and on the degree of rotation of the fragments on the long axis of the bone. This rotation winds up the muscles and other soft parts which form ties in the length of the bone. If, as much less frequently is the case, the femur is broken by rotation in a reverse direction, the lower fragment is driven upwards, backwards, and inwards.

Figs. 15, 16, 17, and 18 represent the ordinary form of spiral fracture of the femur produced by indirect violence. At the time the patient, whose fracture is shown in Fig. 15, came under my care an unsuccessful attempt had already been made to unite the fragments, and the wire loop which had been used for the purpose is shown in the skiagraph. I effected accurate apposition subsequently by perforating the fragments and lacing them immovably together with very stout virgin-silver wire. I would urge on the surgeon who operates on a fracture of the femur the importance of employing screws or wire of sufficient strength, since the strain exerted on the fracture in the active and passive movements of the patient is very considerable indeed: also that it is necessary to perforate the fragments, as an encircling wire alone affords no efficient obstacle to their separation from one another. These skiagraphs all show the hopelessness of any surgery other than operative, and they cast very natural doubts on the truth of the statements that are frequently made as to the results obtained by treatment of these conditions

## PLATE XXXVI.

Fig. 15 *shows the relative displacement in a transverse plane of the fragments of the femur in a case of spiral fracture. Their position differs somewhat from that which existed originally, since the lower end of the upper fragment is retained in contact with the lower by an encircling loop of wire.*

## Plate XXXVII.

Fig. 16 *shows the relative position of the fragments of the femur in a case of spiral fracture which had been treated by splints. The upper extremity of the lower fragment has lost through absorption a little of its original length. As in* Fig. 15, *the lower fragment lies outside the upper.*

Fig. 17 *shows the form of fracture and the displacement of fragments of a femur broken by indirect violence. The seat of fracture is lower than in* Figs. 15 *and* 16, *and the axes of the fragments are almost parallel. The character of the fracture, as in the others, shows the absurdity of expecting to bring the broken surfaces into apposition by any means other than operative.*

## Plate XXXIX.

Fig. 18 *shows the displacement of fragments in an antero-posterior plane. The fracture of the femur is lower than in* Fig. 17, *and the influence of the malposition of the fragments in the functions of the knee-joint was disastrous, as one would naturally expect. The nearer the extremity of a long bone the fracture takes place, the greater is the alteration in the mechanics, and the consequent disability in the adjacent joint. Masses of bone or callus have been found in the interval between the fragments and the extremities, edges of which have been partly absorbed in the period following the injury.*

by means other than operation. I might say a good deal more about the accuracy or inaccuracy of many of these statements, but I feel that the skiagraphs afford incontrovertible evidence, and I leave them to speak for themselves.

It is hardly necessary to point out again that the muscles exert no active influence whatever upon the displacement of the fragment, though as swollen and shortened ties they oppose resistance to the replacement of the fragments, and this can only be overcome by operative measures. It seems a pity that anatomists when writing text-books for students do not confine themselves to improving on the existing, generally inaccurate, descriptions of the mechanics and functions of the skeleton, instead of attempting under the title of Surgical Anatomy to confuse the student by statements and illustrations, which are usually extraordinarily incorrect in the face of our knowledge at the present day. Such inaccuracies are liable to impress themselves unduly on young minds at a time when their previous ill-designed method of education has led them to accept undoubtingly and without hesitation whatever they are taught. It is as well to leave surgeons to try to explain these matters as intelligently and correctly as they can in surgical text-books. By the time the student commences the study of surgery he may possibly have to some extent shaken himself free from that mental lethargy which results from an habitual excessive tax on the memory, the curse of a schoolboy's education, and having acquired a more critical and scientific habit of mind have learnt to think a little for himself.

I am indebted to Mr. E. W. H. Shenton for a very large proportion of the excellent skiagrams from which the illustrations are prepared, and for the remainder to Messrs. Allen and Hanbury's Radiograph Department.

# EXAMINATION OF THE BLOOD: WITH EXAMPLES OF THE WIDE RANGE OF ITS VALUE.

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A COMPLETE examination of the blood requires time: it also needs a certain expenditure upon special apparatus. For one, or both, of these reasons it is frequently neglected by the busy medical man. Nevertheless, the help it may afford in many cases of difficult diagnosis is so great that it seems worth while to give instances of cases which prove its practical value.

It is a prevalent belief that an examination of the blood is needed only in the so-called "Blood-diseases." In these, of course, such examination is essential. Thus a patient with an enlarged spleen is not necessarily suffering from spleno-medullary leuchæmia; a leucocyte-count may show no increase in the leucocytes, and the patient may, as a fact, have splenic anæmia. The distinction between these conditions is of great importance. In the former case, removal of the spleen by operation will almost inevitably be fatal; in the latter, such operation may be the means of curing the invalid (Osler).

Again, there may be a leucocytosis up to, perhaps, 50,000 per c.mm.; there may be a moderately big spleen, and it may be doubtful whether some enlarged glands in the neck may not be tuberculous. A diagnosis of early "leuchæmia" may perhaps be made; but this is incomplete. To perfect the diagnosis, a differential count of the leucocytes is needed. There may, for example, be 70 per cent. of small lymphocytes, or even more, indicating the lymphatic type of leuchæmia; or, on the other hand, 30 per cent., perhaps, of myelocytes, with less than 20 per cent. of small lymphocytes, so that the spleno-medullary variety must be diagnosed. The distinction, it may be urged, is of little value from the point of view of treatment; but it changes the prognosis entirely. In the

former case the patient will probably have but a few months to live; in the latter he may survive three years or more.

In another case, with the enlarged spleen there may be no enlarged glands, and there may be a soft cardiac *bruit* and anæmia; here it may be uncertain whether or not the *bruit* is hæmic, and doubts arise as to whether the patient is suffering from leuchæmia or from ulcerative endocarditis. In each there may be irregular pyrexia, so that the temperature-chart will not decide the question. A blood-count may show some leucocytosis, and yet the diagnosis remain undecided. A differential leucocyte-count may be the determining factor. An increased proportion of polymorpho-nuclear cells and an absence of myelocytes will prove the leucocytosis to be due to ulcerative endocarditis rather than to early leuchæmia.

Again, without an accurate estimation both of red corpuscles and of hæmoglobin, and conclusive proof that the hæmoglobin is less diminished than are the red corpuscles, it is impossible to be certain of the diagnosis of pernicious anæmia. Sometimes the cachexia of carcinoma ventriculi may strongly suggest pernicious anæmia until a blood-examination decides against it.

Even should the ratio of hæmoglobin to red corpuscles be of the type found in pernicious anæmia, the diagnosis may easily be wrong unless a differential leucocyte-count be also made. In ankylostomiasis the hæmoglobin-value is also greater than normal; but in this condition there is a considerably increased percentage of the coarsely-granular eosinophile corpuscles, such as is not found in true pernicious anæmia. The treatment of the two conditions is very different; anthelmintics and iron are required in the former state; oral and gastro-intestinal disinfectants, extract of bone-marrow, and arsenic in the latter.

But it is not only in the "Blood-diseases" that examinations of the blood may be the turning-point in diagnosis, nor is it always the same part of a complete blood-examination which turns the scale in different cases. Sometimes the diagnosis may depend upon the total number of leucocytes; sometimes upon the differential leucocyte-count; sometimes upon the ratio of hæmoglobin to red corpuscles; sometimes upon the total number of red corpuscles; sometimes upon the specific gravity of the blood.

That this is not purely theoretical advice will best be shown by quoting actual cases.

### I.—TOTAL NUMBER OF LEUCOCYTES.

First, and simplest, are *cases in which the total leucocyte-count has changed the diagnosis.*

In the following three instances the original diagnosis was typhoid fever; and, as they show, the fact that there is no leucocytosis, but rather a leucopenia, in enterica may frequently be made use of for diagnostic purposes.

(1) Florence A., aged 23, having been ill ten days with headache, feverishness, anorexia, and obscure abdominal pain, was sent to Guy's Hospital as suffering from typhoid fever, and admitted under the care of Dr. Hale White. Her temperature was 101·8° F., her pulse 95, and her respirations 16 per minute. At the same time that blood was taken for a Widal test, a blood-count was made, and 24,000 leucocytes per cubic millemetre were found. The differential count showed:—

| | |
|---|---|
| Polymorpho-nuclear cells | 80 per cent. |
| Small lymphocytes | 9 „ |
| Transitional forms | 1·5 „ |
| Large lymphocytes | 9 „ |
| Coarsely-granular eosinophile cells | 0·5 „ |

The conclusion, therefore, was that the condition was not one of enterica, but rather of deep-seated suppuration. There were no pelvic symptoms, and the patient was unmarried; but there was considerable abdominal pain, and, following the lead given by the total and differential leucocyte-counts, laparotomy was performed in the middle line. Double pyo-salpinx was found, and the patient made a complete recovery after removal of the tubes.

(2) Mary W., aged 14, was perfectly well up to August 29, and on that day was sent home from school on account of severe headache. That night she was feverish, and was sick, but complained chiefly of her headache. She stayed in bed next day; on the day following she came into hospital, under the care of Dr. Hale White. Headache, pyrexia, and some general abdominal pain were her chief symptoms. The temperature was 101·2° F.; the respirations 22 per minute;

and the pulse 120. There was nothing definite to be made out in the abdomen; and on rectal examination no abnormality was discovered. It seemed to some that the girl must be suffering from typhoid fever, though the spleen was not palpable. It was too early for rose-spots to have appeared, or for the Widal reaction to be expected. A blood-count changed the diagnosis at once. It revealed the presence of 49,000 leucocytes per cubic millimetre, and typhoid fever was excluded. The abdominal pain suggested deep-seated pus as a cause for this leucocytosis. There being no localising symptoms, the abdomen was opened in the middle line; a deeply situated appendicular abscess was discovered, opened, and drained; and the patient made a complete recovery.

(3) Henry S., aged 43, was admitted under the care of Dr. Perry, having been ill a fortnight. During this time he had suffered from severe headache, a cold in his nose and throat, and pains in his loins; he had also noticed some lumps in his left groin. He had had no sore place on his leg, foot, or buttocks; had no discharge from his penis; and had had no rigor. The lumps in his groin appeared to be enlarged glands, but no cause for their enlargement could be discovered; they were not very tender, red or inflamed. His temperature was 102·4° F., his pulse 88, and his respirations 30 per minute. He thus exhibited the comparatively slow pulse-rate in proportion to his temperature, which is so common in typhoid fever; and he had, moreover, about a dozen rose-red spots upon his abdomen, strongly suggestive of enterica. His spleen was not palpable, nor had he bronchitis. He came in on September 10th, and his temperature fell by stages, reaching normal on September 15th. It remained normal until October 4th, during all which time he was treated as a case of typhoid fever. The glands in his groin showed little change. On October 4th the temperature rose again, and remained continuously raised until October 12th, as though there had been a relapse. The leucocytes had been counted on September 15th, when they were 9,700 per cubic millimetre. The next counts were:—

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| On October | 6th | - | - | 13,600 | per | cubic | millimetre. |
| „ | „ 7th | - | - | 16,250 | „ | „ | „ |
| „ | „ 8th | - | - | 14,100 | „ | „ | „ |
| „ | „ 9th | - | - | 17,800 | „ | „ | „ |

| | | | | | | |
|---|---|---|---|---|---|---|
| On October | 10th | - | - | 17,000 | per cubic | millimetre. |
| „ „ | 11th | - | - | 17,500 | „ „ | „ |
| „ „ | 12th | - | - | 14,200 | „ „ | „ |
| „ „ | 13th | - | - | 11,718 | „ „ | „ |
| „ „ | 20th | - | - | 12,000 | „ „ | „ |

Such definite leucocytosis argued strongly against enteric fever, and suggested pus retained under pressure. Nevertheless, though the Widal reaction was negative, so closely did the patient resemble one suffering from enterica, that it was only in November that this diagnosis was finally abandoned. By this time (seven weeks after patient's admission) the inguinal glands began to soften; the skin over them grew red, and a needle inserted into them withdrew pus, from which a pure culture of Staphylococcus pyogenes aureus was obtained. The abscess was incised and drained, and the patient got quite well.

Such instances of the valuable assistance afforded by counting the leucocytes in doubtful cases of typhoid fever, particularly when the symptoms are abdominal, might readily be multiplied.

Another group of cases in which the same means may be invaluable in deciding the diagnosis is that in which the *doubt lies between hepatic abscess and malaria.* This will naturally be of greatest service in the tropics; but not infrequently the difficulty arises in this country also, in patients who have returned home from abroad. As Rogers (*British Medical Journal*, 1902, Vol. II., p. 850) has found in many instances, a liver-abscess is accompanied by as decided a leucocytosis as 30,000 or 40,000 leucocytes per cubic millimetre; whereas malaria resembles typhoid fever in showing leucopenia, the leucocytes rarely numbering more than 5,000 per cubic millimetre; and a differential count reveals a high percentage of large lymphocytes. Hence, in a doubtful case, the simple process of making a total leucocyte-count may decide whether the treatment is to consist in the administration of quinine, on the one hand, or in an exploration of the liver upon the other.

### II.—DIFFERENT VARIETIES OF LEUCOCYTES.

Secondly, examples may be given of *cases in which a differential count of the leucocytes has decided the diagnosis.*

(1) Frederick M., aged 28, was a married man, with young children entirely dependent on him. He had been for some years

in the Hoogley Pilot Service, from which he derived a good income, with the prospect of a pension in the course of time. Should he be invalided from the Service, ruin stared him in the face. Five years previous to his coming to Dr. Bryant for examination he caught a severe cold when on duty on a steamer, since which time his cough had never quite left him. Latterly he had been subject to peculiar paroxysmal attacks of coughing, which came on suddenly, and lasted variously from ten minutes to an hour. They recurred sometimes as often as two or three times in the twenty-four hours. They were at first treated as asthmatic, but without great benefit; and then, owing to the somewhat "brassy" character of the cough, the condition was variously thought to be one of thoracic aneurysm or of malignant growth. On this account he was given six months' furlough to return to England from the Hoogley, in order to confirm one diagnosis or the other. If tumour or aneurysm were the malady, he would be invalided from the Service; if it proved to be a less serious condition, he would retain his post. From the patient's point of view it was a most momentous question to decide. The fact is well known that a differential leucocyte-count in asthma, during the paroxysms or when they are frequent, often reveals a high proportion of the coarsely-granular eosinophile cells. A blood-examination was therefore made, with the following results :—

| | | |
|---|---|---|
| Red corpuscles | - | 6,587,500 per cubic millimetre. |
| White corpuscles | - | 10,625 „ „ |
| Hæmoglobin | - | 90 per cent. |

The differential leucocyte-count, in which over 1,000 corpuscles were enumerated, was as follows :—

| | | |
|---|---|---|
| Small lymphocytes | - | 13 per cent. |
| Large lymphocytes | - | 4 „ |
| Polymorpho-nuclear cells | - | 24 „ |
| *Coarsely-granular eosinophile cells* | - | *59 per cent.* |

The films were most remarkable; of every two leucocytes one was a coarsely-granular eosinophile cell; under the oil-immersion lens as many as five or six such cells might be seen in the field at once. This was strong evidence in favour of asthma as the diagnosis. A very careful examination was further made before new growth and aneurysm were finally

excluded. The chest was emphysematous, and the heart-sounds inaudible. The lungs were everywhere resonant, the entry of air equal on the two sides, and there were no distended veins on the chest-wall; the patient was robust and strong. His radial pulses were equal, and he had no tracheal tugging. His pupils were equal, he had no pain; and he gave no history, and showed no evidence, of syphilis. He was skiagraphed, and no sign of growth or aneurysm could be seen. His voice was, he said, different to what it had been, so that he could no longer sing; but the laryngoscope showed no sign of a foreign body in the larynx, nor of a papilloma or malignant growth, nor of any paralysis of either vocal cord. His cough, as has been stated, was undoubtedly "brassy," and suggestive of thoracic aneurysm. Nevertheless, all the other signs being negative, and the differential count being very positive, it was largely on the strength of the greatly increased number of coarsely-granular eosinophile cells in his blood that the patient was able to retain his post in the Hoogley Pilot Service; and there has since been no reason for changing the diagnosis of asthma thus made.[1]

Actual examples are so much more impressive than the mere statement of a general fact, that the following may be given as illustrating quite another group of cases :—

(2) Nathaniel H., aged 20, had been on active service in South Africa. While there he had noticed nothing the matter with himself; but on his return to England he found that his feet began to swell, and from time to time he passed blood in his urine. When examined his urine contained bright blood and albumen (2 parts per 1,000). A few blood-shreds were found, which might possibly have been casts; and it was thought that he was suffering from a mild attack of Bright's disease. This necessitated treatment by rest in bed in flannel night-clothes, diaphoretics and purgatives, and a milk-diet. The patient, who had been a soldier, and who felt quite well in himself, naturally found a milk-diet and restraint in bed most irksome; and yet such treatment was essential if his kidneys

[1] The fact that the patient had been in India raises another question. His eosinophilia might have been due to the presence of some parasite. But he was not at all anæmic. He had more red corpuscles than normal. He was a gentleman; a European; and lived mostly on shipboard. These points are all against parasitic infection. Moreover, his fæces always appeared quite normal, though they were not particularly examined for parasitic ova.

were inflamed. A blood-count, however, supplied the following data:—

| | | |
|---|---|---|
| Red corpuscles | - | 80 per cent. |
| White corpuscles | - | 8,500 per cubic millimetre. |
| Hæmoglobin | - | 70 per cent. |

And a differential leucocyte-count showed:—

| | | |
|---|---|---|
| Small lymphocytes | - | 18 per cent. |
| Large lymphocytes | - | 10 „ |
| Polymorphor-nuclear cells | - | 56 „ |
| *Coarsely-granular eosinophile cells* | - | *16 per cent.* |

It is an established fact that many parasitic diseases are accompanied by an increase in the coarsely-granular eosinophile cells. This is the case, for example, in patients harbouring Ankylostomum duodenale, Filaria sanguinis hominis, Trichina spiralis, and Bilharzia hæmatobia. The above differential leucocyte-count strongly suggested that Bilharzia hæmatobia was the cause of the hæmaturia in this patient from South Africa, the œdema being consequent on his loss of blood. Bilharzia eggs were searched for in his urine, but none were found; nevertheless, on the strength of the blood-examination, the diagnosis of Bright's disease was relinquished. To the patient's great joy, full diet was allowed, and no ill-result followed. The hæmaturia, slighter in amount, continued up to the time of his discharge, but he felt quite strong and well, and was happy to know that he was not suffering from Bright's disease.

Not a few similar instances of obscure hæmaturia must have occurred since the war in South Africa began. It is not always easy to find the ova of Bilharzia in the urine. A differential leucocyte-count, revealing an increased proportion of coarsely-granular eosinophile cells, may give the clue to the correct diagnosis.

Another, and yet distinct, group of cases in which the differential leucocyte-count has been a great factor in assisting the diagnosis is that of the Cornish miners. Those who work in certain of the Cornish mines have, for four or five years past, been exceedingly anæmic. Recently, Dr. Haldane and Dr. Boycott (*Journal of Hygiene*, January, 1903) have investigated the nature of this malady, and have demonstrated that it is due to the presence of the Ankylostomum duodenale.

This might have suggested itself long ago, had even a moderately-careful examination of a stained blood-film been made. The differential leucocyte-counts vary widely in different patients, but in nearly every case there was most obvious eosinophilia. An average case gave the following figures :—

| | |
|---|---|
| Small lymphocytes - - - | 18 per cent. |
| Large lymphocytes - - | 8 „ |
| Polymorpho-nuclear cells - - | 52 „ |
| *Coarsely-granular eosinophile cells* - | *22 per cent.* |

Such an increase in the coarsely-granular eosinophile cells suggested a parasitic disease. After the administration of thymol, the diagnosis was verified by the discovery of numbers of the actual worms in the fæces. The differential leucocyte-count, and the subsequent discovery of the worm, entirely altered the lines upon which the treatment of the patients should be carried out.

### III.—ESTIMATION OF HÆMOGLOBIN.

Thirdly, there are *cases in which an accurate determination of the hæmoglobin-value of the corpuscles is essential.*

This is the case, of course, in every case of pernicious anæmia. Not infrequently, however, the colour of the patient may so strongly suggest pernicious anæmia that without the blood-determination a wrong diagnosis may easily be made. The blood-examination may be quite as valuable when it negatives a diagnosis as when it leads to a positive result. The following are two actual cases in point :—

(1) Joshua P., aged 46, was quite well ten months before examination. He then noticed that his skin began to get bright-yellow, and that he was short of breath when he worked as a coal-porter. A doctor saw him, and found that the yellow colour of his skin was not due to jaundice. There was a little wasting as time went on, but not much. There was no vomiting; the bowels were frequently opened three times a day, and on several occasions there was melæna. There was a local cardiac systolic *bruit*, but nothing else could be discovered. The abdomen seemed normal, and a rectal examination revealed nothing. The patient seemed to be suffering from pernicious anæmia. Ten months after his

symptoms began he was in bed, too weak to work, but not cachetic. He was of a lemon-yellow colour, with blanched lips, gums, and hands. There was no jaundice, and he had not been sick once. His blood was examined, with the following result :—

| | | |
|---|---|---|
| Specific gravity | - | 1,036. |
| *Hæmoglobin* | - | *12 per cent.* (by Haldane's hæmoglobinometer). |
| *Red corpuscles* | - | *44 per cent.*, or 2,235,000 per cubic millimetre. |
| White corpuscles | - | 9,375 per cubic millimetre. |

A differential leucocyte-count showed :—

| | | |
|---|---|---|
| Small lymphocytes | - | 18 per cent. |
| Large lymphocytes | - | 6 „ |
| Polymorpho-nuclear cells | - | 75 „ |
| Coarsely-granular eosinophile cells | - | 1 „ |

The hæmoglobin value of the red corpuscles was therefore $\frac{12}{44}$, much less than unity, instead of more, as it is in pernicious anæmia. The blood-film showed many poikilocytes, megalocytes, and microcytes, and, in counting 1,031 leucocytes, 7 nucleated red corpuscles were seen. Poikilocytosis, irregularities in the size of the corpuscles, and the presence of nucleated red cells, are distinctive of no single form of anæmia ; these changes occur in every form of anæmia, if it is severe. The diagnosis was, therefore, other than pernicious anæmia ; and a common cause of severe anæmia in middle-aged persons is gastric carcinoma. The patient had given no evidence of gastric symptoms ; but whilst he was kept under observation by Dr. Fawcett he developed abdominal pain, and rigidity of his right rectus abdominis muscle, with tenderness. He began to be sick—at first occasionally, later often—and the vomit contained no free hydrochloric acid. The blood-examination had been the means of making the diagnosis by excluding pernicious anæmia, which was so closely simulated in the earlier stages of gastric carcinoma.

(2) John D., aged 40, was admitted under the care of Dr. Hale White, having the outward appearance of a patient suffering from pernicious anæmia. He began to be "out of sorts" six months previously. His skin began to be bright-yellow in colour, and his feet and legs swelled ; three months

later he fell down when doing his work, and consulted a doctor. He was then weak and anæmic, without paralysis; no jaundice was present, but the skin was of a lemon-yellow tint, and there was some œdema of the legs. When admitted to hospital the condition was very similar. He was short of breath on exertion, but otherwise seemed well; and he was not wasted. His heart was of normal size, and there was a blowing systolic *bruit*, best heard in the third left space, but also heard in the aortic area, and at the point of impulse. The patient might well have been suffering from pernicious anæmia with hæmic *bruits*, but a blood-examination excluded this at once. There were found:—

| | | |
|---|---|---|
| *Red corpuscles* | - | *51 per cent.*, or 2,600,000 per cubic millimetre. |
| White corpuscles | - | 5,500 per cubic millimetre. |
| *Hæmoglobin* | - | *28 per cent.* (by Haldane's hæmoglobinometer). |

Far from being greater than unity, the hæmoglobin value of the red corpuscles was $\frac{28}{51}$, and pernicious anæmia was negatived. Streptococci were cultivated from the patient's blood, and the case turned out to be one of ulcerative endocarditis.

Instances of cases in which different diseases have at first strongly suggested pernicious anæmia might readily be multiplied. It is by means of a blood-examination that the mistake can be avoided.

### IV.—ENUMERATION OF RED CORPUSCLES.

Fourthly, we have *cases in which counting the total red corpuscles is important to the diagnosis*. These include all cases of anæmia. It is by enumerating the red corpuscles that the improvement produced by any given form of treatment can best be gauged in each individual patient. But in a few other cases counting the red corpuscles has also assisted the diagnosis. For example:—

Percy D., aged 4, was admitted under the care of Dr. Bryant for dyspnœa and cyanosis. When he was a year old he began to have cough and attacks of dyspnœa and cyanosis; and he had had these attacks at frequent intervals. He had, however, become much worse three weeks before admission. He was now very cyanosed, and his fingers and toes were

clubbed. His condition strongly suggested congenital heart-disease, but upon examination of his heart no abnormality beyond a somewhat increased area of præcordial dulness could be detected. There was no cardiac *bruit* at all. His lungs were resonant, but râles and rhonchi were numerous all over them, and there was a possibility that the primary trouble was in the lungs themselves. The blood was examined, and the red corpuscles were *15,462,800 per cubic millimetre* when taken from the ear; and in another specimen from the middle of the back, where there was less congestion, there were found 14,025,000 per cubic millimetre. In many different forms of cyanotic congestion the total number of red corpuscles has been found increased, as, for example, in cases of mitral stenosis; also in persons who live at high altitudes; but of all conditions, congenital heart-disease is found to give the most marked increase. So great a rise as the above, up to three times the normal number (the white corpuscles at the same time were 6,875 per cubic millimetre), was strong ground for confirming the diagnosis of congenital heart-disease.

### V.—SPECIFIC GRAVITY OF THE BLOOD.

Lastly, *there are cases in which a determination of the specific gravity of the blood is of importance.*

The clinical symptoms of shock and of collapse are not easily distinguishable; but the pathology, and therefore the treatment, in these two conditions is very different. Expressed in as few words as possible, collapse results from excessive loss of fluid from the tissues, as, for example, after severe diarrhœa and vomiting in children; whereas shock is thought to depend upon paralysis of the vasomotor control, so that blood accumulates excessively in the splanchnic area. Collapse should be treated by replacing the fluids in the tissues by such methods as saline infusion; shock, on the other hand, by driving the excess of blood out from the splanchnic area, as by the "leg up and head down" position, and by bandaging the abdomen. There can be little doubt that many patients are infused when such procedure can do no good. An estimation of the specific gravity of the blood would indicate whether infusion should be resorted to or not. As is explained later, the determination is rapid and easy, and requires but a single drop of blood. If, as

in collapse, fluid has been drained from the system, the blood becomes more concentrated, and its specific gravity will be raised. If, as in shock, no fluid has been so drained away, but the blood has accumulated in the abdominal veins, the vessels nearer the surface will absorb water from the tissues, and the red corpuscles and albumen will be diluted, so that the specific gravity of the blood will be lowered. A raised specific gravity would be an indication for infusion, and for repeating the infusion many times, at intervals, as long as the specific gravity remained high.

### VI.—METHODS OF EXAMINATION OF THE BLOOD.

And now to turn to the methods of a blood-examination.

First, as to the *method of making and staining blood-films*. It is most essential that the cover-glasses should be quite clean. If they are the least greasy, the film will not be a success. To clean the slips—and it is as easy to clean a thousand as a hundred—a simple and most efficient plan is to boil them in a solution of chromic acid. A small enamelled iron saucepan is suitable for the purpose; it should be half filled with water, and a tablespoonful of commercial chromic acid added. This dissolves readily; the water should be brought to the boiling-point, and then allowed to simmer gently. If vigorously boiled, the chromic acid splashes over. Chromic acid is better than nitric acid, because the latter gives off dense noxious fumes. Into the gently-simmering solution the cover-glasses are dropped *one by one*, to ensure the acid reaching them on both surfaces; and the whole is left simmering for half an hour. At the end of that time all grease will have been removed; the boiling is stopped; the chromic acid is washed away by a gentle stream of tap-water until no yellow colour is left between any two of the cover-slips; the tap-water is as far as possible poured off, and as much as possible of the remainder displaced by gently rinsing the whole mass of cover-slips with two or three changes of rectified spirit. Each cover-slip is then picked up individually with forceps, and transferred to a cylindrical glass jar filled with absolute alcohol. The absolute alcohol into which they are thus put will become contaminated with the residue of spirit on each cover-glass; so that, when the jar is full of cover-slips, the original absolute alcohol should

be poured off, and the vessel filled with fresh. It should then be stoppered, and the slips are ready for use. When one is needed, it is taken out with forceps; the alcohol is burned off in the flame of a spirit-lamp, and the glass is left quite clean and dry. Should it splinter in the flame, it means that the alcohol is not quite "absolute," and the splintering ceases if that in the jar be poured off and fresh pure alcohol poured in.

The lobule of the ear is the best place from which to procure blood for an examination. The lobule is sometimes cleaned with ether first; but warm water is as good, and then the ear should be carefully dried. Holding the lobule firmly at its base, between two fingers of the left hand, a quick deep stab is made with the needle, and the patient feels a very trifling pain; this pain is made less obvious when the lobule is firmly held by the operator's left hand. The first drop of blood is wiped off, and the next may be used either for a film, or for counting corpuscles, or for hæmoglobin-estimation, or for determination of specific gravity; and successive drops may be used for all four.

An excellent way of making a film is by means of a cigarette-paper. The latter is cut just narrower than the cover-slip; a drop of blood is touched with one end, being lightly smeared along a thin line at the machine-cut edge of the paper; the blood-smeared end is then laid, smeared surface downwards, upon one end of a cover-slip, and the cigarette-paper drawn quickly and steadily along the surface of the glass. A little practice will ensure the making of smooth, even films, and their thickness may be varied by varying the angle at which the cigarette-paper meets the cover-slip. The blood should dry upon the glass almost as quickly as the paper is drawn along; otherwise the corpuscles run together in *rouleaux*.

The film having been made, the question arises as to how best to stain it. Many observers prefer Jenner's stain, because it both fixes and stains at the same time, and in a few minutes. Others prefer fixing the film by dry heat at 120° C. for two hours, and then staining with methylene blue and eosine. For differential counts some prefer Phear's stain, which is put upon the lobule of the ear; the ear is then pricked through it, and a drop of mixed blood and stain examined

fresh, without making a film at all. But none of these methods are more certain in their results than the old-fashioned hæmatoxylin and eosine. The blood-film, as soon as it is dry, is dropped into a mixture of equal parts of absolute alcohol and ether. It is left for twenty-four hours, and next day is ready to stain. In another glass jar is kept some undiluted Delafield's hæmatoxylin, and in a third some watery eosine. The film, taken from the jar of alcohol and ether, is washed in water (preferably, but not necessarily, distilled); and then dropped into the jar of hæmatoxylin. In this way the stain is not wasted, but may be used again and again. The film is stained for five minutes, then washed in *tap*-water, which "blues" it; next dropped into the jar of eosine for thirty seconds; again washed in water, allowed to dry in the air after the excess of water has been removed with absorbent paper, and then mounted in Canada balsam. It is now ready for examination.

A rough observation may be made at once under the $\frac{1}{6}$-in. lens. If a differential count is needed, it is preferable to wait a little till the Canada balsam has somewhat set. For the differential leucocyte-count the $\frac{1}{12}$-in. lens. is very convenient, though the $\frac{1}{6}$-in. will do. The film should be moved continuously across the field from end to end by means of the mechanical stage; each leucocyte, as it is seen, should be noted down under its proper variety; and when the end of one row is reached, the film should be moved down exactly the width of one microscope-field. The next row is then counted right across the slide as before, and so on, until a sufficient number of white corpuscles have been counted. For a very rough enumeration, 100 may be enough; for accuracy, not less than 1,000; and even successive thousands, upon the same film, do not give identical proportions of the different leucocytes. It is a simple matter now to calculate, in percentages, the proportions of each. In health there are four easily distinguishable kinds of white corpuscles. The names given by different observers are very various, but the average proportions are:—

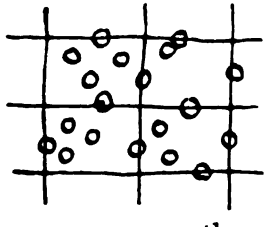
| | |
|---|---|
| Small lymphocytes - - | about 25 per cent. |
| Large lymphocytes (or hyaline-leucocytes) - - - | „ 8 „ |

| | |
|---|---|
| Polymorpho-nuclear cells (finely-granular eosinophile cells or neutrophile cells) - - | about 65 per cent. |
| Coarsely-granular eosinophile cells | „ 2 „ |

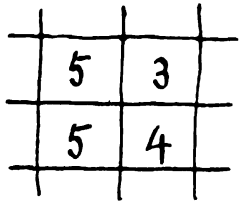
The chief difficulty, in counting a film, is in deciding whether certain of the cells should be classed as small or as large lymphocytes. Between the typical examples of these two varieties there are uncertain or intermediate forms. Such are usually counted as small lymphocytes.

As regards the enumeration of the red corpuscles little need be said. The Thoma-Zeiss apparatus is familiar, and is described in text-books. It is useful to know that, if blood be drawn into the pipette up to the mark 0·5, and Hayem's fluid[1] up to the mark 101, so that the dilution is 1 in 200, then the number of red corpuscles in every sixteen small squares is the *percentage* of red corpuscles; that is, with normal blood sixteen small squares should contain 100.

In order to ensure not counting the same corpuscle twice over, when it overlaps a cross line, it is well to regard any corpuscle as belonging to a square whenever it in any way touches the top or the right-hand line bounding that square; and as not belonging to the square when it touches the left-hand or bottom lines. For example, in the following diagram :—



the count is :—




If possible, sixteen sets of sixteen small squares should be counted, and the average taken of the whole number.

[1] **Hayem's fluid is composed of :—Mercuric chloride, 0·25 grammes; sodium chloride, 0·5 grammes; sodium sulphate, 2·5 grammes; and distilled water, 100 cubic centimetres.**

In counting the leucocytes it is better to use a dilution of 1 in 20, or of 1 in 10, and to count the leucocytes, not in the small squares, but in the large squares, each of which consists of sixteen small squares. They are so few in comparison with the red corpuscles, that a separate pipette and a smaller dilution are needed. In Thoma's fluid[1] the acetic acid lakes the red corpuscles, so that they disappear; and the leucocytes, stained by the methyl-violet, stand boldly out. At least sixteen of the big squares should be counted, and in doing this the mechanical stage is of great advantage.

The estimation of the hæmoglobin used to be a very unsatisfactory proceeding until very recently. One great difficulty was that the colour of the blood had to be compared with that of coloured glasses, or coloured solutions, such as carmine; the comparison varied in different lights, and the colour of the shed blood itself was rapidly altering during the time of comparison. Now, however, Haldane's hæmoglobinometer has obviated the difficulties of the older instruments, and reliable readings may be obtained with the greatest ease. The standard colour is a definite dilution of carboxy-hæmoglobin in a sealed tube, and the solution is quite permanent. By means of a small pipette a measured quantity of the patient's blood is obtained, and immediately mixed with distilled water in a graduated tube, so that the corpuscles are laked. The next proceeding is to convert the oxy-hæmoglobin into carboxy-hæmoglobin. This is readily done by means of coal-gas, introduced from an ordinary gas-burner through a brass U-tube provided for the purpose; and the carboxy-hæmoglobin derived from the patient's blood is diluted until the tint is exactly that of the standard carboxy-hæmoglobin in the sealed tube. The process occupies but a minute or two, and the comparison of one carboxy-hæmoglobin solution with another can be made, in any light, with accuracy. The percentage of hæmoglobin is then read off on the scale upon the mixing-tube. An additional advantage in this instrument is that there is a definite blood-standard; "normal" blood being such as yields 18 c.c. of oxygen from every 100 c.c. The apparatus is fully described in the *Journal of Physiology*, Vol. XXVI., 1901, p. 497.

[1] Thoma's fluid consists of a solution containing 0·3 per cent. of acetic acid in water, coloured with a few drops of methyl-violet.

Lastly, the specific gravity of the blood is easy to determine. Chloroform and benzene mix readily together; the specific gravity of the former is high, that of the latter is low. By mixing the two in different proportions a fluid of any intermediate specific gravity may be prepared. The best plan is to begin with a mixture of which the specific gravity is about 1,056, the average for normal blood. This is poured into an ordinary urine specimen-glass, or other suitable and sufficiently deep glass vessel. A drop of blood is drawn up into a fine glass pipette, such as that in the hæmoglobinometer; and the drop expelled into the mixture of chloroform and benzene. If it float, the specific gravity of the fluid is too high; more benzene must be added. If it sink, more chloroform. It is useful to have two specimen-glasses, so that the fluid, with the drop of blood, can be poured from one to the other, and complete mixture ensured. By adding a little more chloroform or a little more benzene according as the bead of blood sinks or floats, a point will rapidly be reached at which the drop neither sinks nor floats. Lest the droplet should have altered in specific gravity since it was placed in the mixture, a fresh drop may now be put in. If this neither sink nor float, the specific gravity of the mixture of chloroform and benzene, as read off upon the urinometer floated in it, will be the specific gravity of the blood.

A complete blood-examination may be carried out in the following order:—The ear is pricked. (1.) Blood-films are made and dropped into absolute alcohol and ether. (2.) Blood is drawn up into the red-corpuscle pipette to the mark 0·5, diluted to the mark 101 with Hayem's fluid, quickly mixed, and put aside to count presently. (3.) The same is done with blood in the white-corpuscle pipette. (4.) Blood is drawn up to the mark on the hæmoglobinometer pipette, expelled into a little distilled water in the graduated tube, and thus laked. (5.) Then another drop is taken in the same pipette, and put into the mixture of benzene and chloroform. The pipette should then be cleaned. This is quickly done by drawing distilled water up into it two or three times, blowing it out again each time; then in the same way drawing up absolute alcohol twice successively, to dehydrate the tube; and finally ether in the same way, to remove the alcohol, and to leave

the tube dry and clean when the ether evaporates, as it does in a few minutes. The determination of the specific gravity may then be completed; and the chloroform and benzene returned to a stoppered bottle for future use; the blood-drops are readily filtered out by pouring it through muslin. The hæmoglobin-estimation may then be continued and completed. Finally, after further complete mixing in the pipettes before samples are taken, the red and the white corpuscles are successively enumerated under the microscope. The films wait till next day, and then require but ten minutes for their staining and mounting.

The complete blood-examination, without a differential leucocyte-count, need not occupy more than three-quarters of an hour; a differential count will make the time required a little longer. In many cases a partial examination is all that is required. In one, for example, only the specific gravity; in another, only the total number of leucocytes; in another, a differential count of the leucocytes. Such a partial examination requires comparatively little time; how extremely valuable it may be in certain instances, and under widely differing circumstances, has been emphasised by the cases already quoted.

# LORENZ'S METHOD OF TREATING CONGENITAL DISLOCATION OF THE HIP.

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[With Plates XL.–XLII.]

Lorenz's method of reducing congenital dislocations of the hip by manipulation, after stretching, &c. of shortened muscles, ligaments, and fasciæ, with subsequent formation of a stable articulation by functional measures (*e.g.*, making the patient walk for a time with the affected limb or limbs in the position of complete abduction and hyperextension) has now been before the profession for seven years. Lorenz's first paper dealing with the subject was published[1] in 1895. At the International Medical Congress held at Moscow in 1897 he reported 160 cases with only 5 relapses. Since that time in every country those surgeons who are responsible for the treatment of such cases have practised the method with varying percentages of perfect results, but always with a sufficient number of completely successful, and of distinctly improved, cases to warrant their continuing to practise the plan of treatment.

It is not to be supposed that every detail of the method is new to surgery, nor that the principles involved had not been in the minds of earlier workers. There is, however, in the sequence of events involved in the method quite sufficient originality to justify our thinking of it and describing it as "Lorenz's."

The immediate evolution of the operation and after-treatment was difficult: the process involved anxiety and labour on the part of the surgeons, and many unfortunate accidents to limb and life on the part of their patients. The antiseptic era led, as was inevitable, to hopeful plans of attack

[1] Lorenz, *Ueber die unblutige Behandlung der angeborenen Hüftverrenkung mittels der functionellen Belastungsmethode. Centralbl. für Chirurg.*, No. 33, 1895.

on a deformity usually so formidable and so crippling. First Hoffa devised an operation from the posterior aspect of the joint. In 200 cases he had 6 fatalities. By making an anterior instead of a posterior incision Lorenz improved on Hoffa's operation with results so far superior that the latter[1] candidly admitted :—"The final functional results were not so good as I had expected, seeing that successful reduction had been accomplished; and Lorenz soon showed the reason of this, namely, that the pelvi-trochanteric muscles were not shortened, but, on the contrary, were elongated, and he had modified my operation by opening the joint from the front and leaving the pelvi-trochanteric muscles intact. In exchange he recommended section of the adductors and the attachments of the hamstrings to the tuber ischii in order to neutralise the shortening of these muscles. Later he showed that these multiple tenotomies were not altogether harmless, and that retraction could be overcome by forcible stretching at the operation." Thus for a time Lorenz's modification of Hoffa's operation was followed, and many cases were treated by it abroad and a few in this country, the scientific basis of the operation having been fully put forward by Lorenz in a monograph[2] in 1895. Time showed that even the improved method was not all that had been hoped. However deplorable the condition of many who suffer from congenital hip-dislocation may be, it is not a condition that threatens life. The "*indicatio vitalis*" is wanting. This being the case any deaths traceable to the operation have a most serious import. Of 260 patients operated on by Lorenz by the anterior incision, 4 died. The death-rate of one continental operator was as high as 10 per cent. There were other drawbacks :—Complete ankylosis, in some cases bilateral, and hence of a seriously-crippling character, resulted. Apart from complete ankylosis, there was not infrequently a painful stiffness that required treatment, not only immediately after the operation, but from time to time for years afterwards. Some patients who have been recently shown in London, after having undergone the open operation, exhibited this painful stiffness. These and other drawbacks led Lorenz to relinquish the

[1] Hoffa, *Orthopædic Surgery*, 1898, p. 584.

[2] Lorenz, *Pathol. und Therap. der angeborenen Hüftverrenkung*, Wien, 1895.

open operation, to perfect which he had laboured so long and so hard. As the present writer has observed elsewhere:[1] —"It is a striking comment upon recent experience in the treatment of this formidable malformation, that whilst Lorenz in his monograph dealing with the subject, which was published in 1895, recommended operative interference as the only hopeful measure, unless in certain exceptional cases where the anatomical conditions allowed of the head of the bone being replaced in the acetabulum without operative interference, a little later the same surgeon no longer recommended the operation, but a bloodless method of reduction and subsequent treatment which combine some original features with others previously practised, *e.g.*, by Roser, Schede, Mikulicz, and Paci."

The subject of the treatment of congenital dislocation of the hip, including Lorenz's method, was brought prominently before the the British Medical Association in 1901. It is to be regretted that Professor Lorenz was not at that time invited to demonstrate his method at the meeting; for it is evident to those who have seen Lorenz operate that the surgeon who introduced the subject at the meeting had never really performed Lorenz's actual operation at all, and hence, though many interesting details of his experience in performing the open operation were communicated by Mr. Burghard, all his criticisms and disappointments with regard to Lorenz's treatment are of no account. For another reason the missed opportunity of introducing Lorenz's work to the profession in this country is to be regretted: it would have forestalled and nullified the distasteful outpourings of the lay press, which were the inevitable consequence of Lorenz being summoned to cross the Atlantic for the purpose of operating on the only child of a very wealthy American citizen. I am convinced that to no one can this newspaper activity have been more distasteful than it was to Lorenz, whose work was distorted and misrepresented by it.

When, on his return to Europe, Lorenz passed through England, the opportunity of seeing him perform his improved operation was not one to be missed by any surgeon interested in such cases. It was thus with pleasure that, amongst others,

[1] Jackson Clarke, *Orthopædic Surgery*, 1899, p. 288.

I accepted the invitation of Mr. Robert Jones to be present at the demonstration given by Lorenz at the Southern Hospital, Liverpool, on January 10, 1903. What I learnt from this demonstration led me to join in inviting Lorenz to repeat it in London.

*The Operation.*—Manipulation and manual force are alone used.

*Stage* 1.—The first step after the patient is anæsthetised is to overcome the resistance of the adductor muscles of the thigh. For this purpose the operator forcibly abducts the limb whilst an assistant steadies the pelvis; this causes the inner edge and tendon of the adductor longus to stand out like a bow-string close under the skin. Keeping the parts thus on the stretch, the operator, by repeated "hacking" strokes made with the ulnar border of the hand at a point a little below the attachment of the muscles to the pelvis, produces a subcutaneous division, not only of the whole of the adductor longus, but also of parts of the deeper-lying adductors. At the completion of this stage of the operation the adductors no longer project under the skin; even in complete abduction there is no longer any muscular ridge, but instead of this a flat surface of muscle over which an empty fold of skin can readily be pinched up.

*Stage* 2.—The contracted muscles on the posterior aspect of the joint are stretched by forcibly flexing the hip. In doing this the knee is kept extended, and the limb is bent upon the trunk with intermittent movements of a swinging character, until the foot can be carried up to the shoulder.

*Stage* 3.—The patient is now turned over and the muscles on the front of the hip-joint are forcibly stretched by producing successive movements of hyperextension of the hip with the knee fully flexed. At the end of this stage the heel can be made to touch the buttocks. All these movements are repeated in turn until complete flaccidity of the muscles is effected. In order to test when sufficient stretching has been produced, downward traction is made on the limb to see whether the head of the bone comes down, as evidenced by the trochanter being brought to the level of, or below, Nélaton's line. In older children this part of the operation is facilitated by preliminary manipulations of the same kind made a few days before, aided, if necessary, by subcutaneous

**Fig. 1.** *A child with bilateral dislocation after operation by Lorenz*

**Fig. 2.** *A child with unilateral congenital dislocation after operation by Lorenz.*

section of the muscles (tensor fasciæ femoris, anterior part of the gluteus medius, &c.) springing from the neighbourhood of the anterior superior spine of the ilium, and by subcutaneous section of the hamstrings. (*See* below, Case 3.)

*Stage* 4. *Reduction of the Dislocation.*—This important step, for which the previous stages are preparatory, is begun by completely flexing the hip, the knee being bent to a right angle, and the thigh slightly rotated inwards. A padded wedge may now be placed behind the pelvis. The flexed limb is then fully abducted by bringing it into the position shown in Figs. 1 and 2, *i.e.*, the thigh forms nearly a right angle with the side of the trunk, and the knee and foot are in a frontal plane posterior to the mesial frontal plane. As this movement is being concluded, the head of the bone can be felt by the operator to clear an obstacle: this is the moment of "reduction," when the head passes forwards over the posterior border of the acetabulum. A sound of reduction of varying loudness is also usually heard. Before the reduction there is an unnatural hollowness of Scarpa's triangle, but as soon as reduction has been accomplished, the head of the femur occupies its normal position and pushes forward the psoas and other soft parts, thus filling up the hollow. Another valuable sign of this reduction is demonstrated by Lorenz; this consists in a rigid flexion of the knee which appears when the head of the bone passes into or over the acetabulum, and disappears when the dislocation is reproduced by adducting the limb. *The actual reduction is brought about by forced abduction.*

*Stage* 5.—The next procedure aims at stretching the anterior fibres of the capsular ligament. For this purpose the pelvis is raised on a support, *e.g.*, a sandbag or a padded wedge, and held firm, whilst the operator intermittently strains the abducted limb into a marked degree of hyperextension. When both joints have been operated on, the parts have then the appearance shown in Fig. 2, the outer surfaces of the knees being posterior to the surface of the patient's back. When once the reduction has been effected, the tension of the muscles and other soft parts assists in retaining the head of the femur in its place and in promoting functionally the deepening of the acetabulum.

*Stage* 6.—The application of the plaster-of-Paris apparatus[1] follows.

The first step is to raise the patient, the sacrum resting on a small padded plate supported on a crutch about 7 inches high fixed at the end of the table, whilst the shoulders rest on a padded box or other support of about the same height. The limb or, if both joints have been operated on, limbs, are held in the position shown in Fig. 1, *i.e.*, completely abducted and hyperextended.[2] A pair of woven woollen drawers[3] without buttons are put on, and an ordinary calico bandage is drawn between the skin and the drawers on each side that has been operated on. Next an ample covering of common (dress-makers') wadding, cut into bandages, is applied, so as to envelop the lower part of the abdomen and the whole of pelvic region, and to cover the thigh (or thighs, if both hips have been operated on) to a point just below the knee. Separate additional pads of wadding are placed below each anterior superior spine, and above each internal femoral condyle. This investment of wadding is then completely and evenly covered in with several layers of calico bandages. The plaster-of-Paris bandages[4] are then applied over the whole area previously covered by the wadding, &c. A considerable number (about twenty-five) bandages are used for a case of double, and about fourteen for a single, dislocation. Before the plaster has set, the patient is removed from the support and the plaster case is cut down to the shape shown in Figs. 1 and 2. When the plaster is dry the drawers are cut and turned back to cover the plaster case. The bandages that were placed between the patient's skin and the drawers are used for daily friction of the skin, which can be thus kept clean and healthy for a long time. A thin towel is placed between the skin and the plaster case in front and behind.

*The new Features in the Operation.*—The most important is the complete severance of the adductor longus, &c. This is

[1] This is a part of the operation that is of no small importance. Those who saw Dr. Müller apply the bandages after Prof. Lorenz had operated could not fail to be impressed and to learn several valuable lessons.

[2] Lorenz teaches that it is not necessary to rotate the limb either inwards or outwards.

[3] Those called "natural wool" are satisfactory.

[4] Lorenz uses an open-meshed very coarse muslin and artists' modelling plaster. He found our ordinary crinoline bandages unsuitable.

produced not by any rude violence but by systematic hand-strokes. A very remarkable phenomenon to witness is the complete disappearance of the adductor ridge. Without this the hyperextended position of the limbs cannot be produced.

The extent of the area covered by the plaster-of-Paris apparatus is much smaller than formerly, when it was thought necessary to envelop the trunk as high as the lower ribs and to include the knee and even the leg and foot.

*The Effect upon the Patients.*—The limb is lengthened so that the skin of the groins often shows superficial cracks. The alteration in the relation of the parts is so great that for some days after the operation the muscular sense is at fault, and if requested to put the hand upon the knees, the child puts the hand where the knees "ought to be," *i.e.*, in the middle line.

*The After-treatment.*—Lorenz now recommends that the plaster case be left untouched for six months. Where only one hip has been operated upon the patient is allowed to walk, the boot on the side of the operation being raised 1½ to 2 inches. Where both hips are involved, the patient can stand by holding a staff in the hand and can hop sideways in either direction, or can sit on a small wheeled seat, which is moved by the feet. In both unilateral and bilateral cases daily passive and active extension-movements are practised at the knees to overcome the rigid flexion of the knee mentioned above as a sign of reduction of the dislocation. After the plaster case is removed at the end of six months the glutei muscles are considerably wasted and require daily massage until they have sufficiently recovered. It is after removal of the plaster case that the really anxious part of the after-treatment begins. Passive and active movements at the hip are to be carried out. For some time these must be limited to adduction and abduction with rotation, flexion and extension being avoided until all danger of re-dislocation is passed. At night a square cushion should be placed between the legs to maintain the position of abduction. In unilateral cases, after removal of the plaster case, abduction during walking is maintained by raising the boot on the sound side. The whole course of treatment varies from one to two years.

*The immediate Effect of the Operation* is to produce a posture which, if it were to be *permanent*, would constitute a deformity

worse than the original one. This aspect of the matter may best be considered by recalling Lorenz's account of his own impressions of the first case which he treated in this way. "Is it permitted to put a human being into this shape?" was the question that arose in his mind on contemplating his patient fixed up in the plaster case. Some months later, when the plaster had been removed, the patient presented a spectacle of deformity—complete abduction of both thighs—worse than at first. "With sad misgivings," as far as my memory of Prof. Lorenz's words serves me, he sent the child away for a year. The child returned with normal hip-joints and walking in a perfectly normal manner. What satisfaction which the surgeon then felt can be imagined.

*What we have learnt from Lorenz's Visit to England.*—As may be gathered from what has been stated above, we have learnt that we in England have not hitherto been doing Lorenz's operation, save in a minority of cases—those in which there is little resistance of muscles and in which the limbs readily assume the requisite position without percutaneous division of certain of the adductors. We have also learnt many essential details of technique and after-treatment, which make all the difference between success and failure. But even when carried out with less thoroughness than experience has shown to be requisite, Lorenz's treatment has not failed to yield good results. For example, I have notes of about 20 cases that I have operated on between the years 1896 and 1902. One of these patients, a girl now aged 7, I operated on for marked unilateral dislocation three years ago. At the present time the previously dislocated joint is in every respect normal, though there is a trifling shortening of the limb owing to defective growth previous to operation. Nearly all the others are improved by lessened lordosis and increased stability of the joint. The one case that failed entirely was a case in which spastic paralysis complicated double congenital dislocation of the hips. In this case, as shown by skiagraphs, a true reduction was effected on each side, but the spastic condition and the abnormal mental irritability of the patient combined to frustrate the after-treatment.

*Case* 1.—Violet ——, aged 4 years and 8 months, was sent to me by Dr. A. E. Wilson. A skiagraph showed double congenital dislocation of the hips. The elevation of the

trochanters and the adduction and lordosis were all of marked degree; and there was so much fixity of the displaced femoral heads that, until the skiagraph was taken, I was not sure that the case might not be one of Coxa vara, especially as the child suffered from slight rickets, and had a habit of sleeping with the lower limbs flexed upon the abdomen, the feet resting at the sides of the face.

In December, 1902, with the assistance of Drs. A. E. Wilson and W. B. Parsons, I attempted the reduction of the right hip. Owing to my not at that time having learned the importance of completely overcoming the resistance of the adductors by the method described above, I was unable to complete the reduction without too great risk of an ephiphysial separation taking place. I decided to defer the operation until the muscular resistance had been diminished by repeated manipulations and, in the intervals, by weight-extension. The patient soon after this contracted chicken-pox, and the completion of her convalescence happened to coincide with Professor Lorenz's visit to London. He kindly consented to operate on the child and did so on January 14, 1903. It is noteworthy that the right hip, the one previously operated on, was more readily reduced than the left. For a day or two after the operation the right hip was perfectly normal in appearance, whilst there was swelling and some discoloration about the left. Though the patient is a rather delicate and nervous child, there was no more shock than was accounted for by the somewhat prolonged anæsthesia. She slept and ate well, when the effect of the anæsthetic had passed off. The inner femoral condyles were painful for a few days from the pressure of the plaster case. The flexion of the knees was very marked at first, and passive movements were resented by the patient. By January 23 these little troubles had ceased, the abrasions in the groins had healed, and the child performed active knee-extension exercises, and permitted passive movements without discomfort. She is now bright and well.

*Case 2.*—Annie ——, aged 4½. Congenital dislocation of the right hip. On January 14, 1903, she was operated on by Professor Lorenz. Reduction was easy and knee-flexion slight. The child slept well after the operation. On January 16 she was ready to walk, as shown in Fig. 2. The right boot was raised 1½ inches, and the patient left the hospital on January 27.

*The anatomical result* is perhaps best approached by considering the anatomy of the deformity in early life. The accompanying figures[1] are taken from a specimen which I dissected in 1895. At birth the head of the bone lies above, but close to, the shallow acetabulum. The dislocation is easily reduced by inward rotation of the limb (Figs. 3 and 4). When

Fig 3. *The hip of a child at birth showing congenital dislocation. The upper part of the capsule is thinned out and dilated by the displaced head of the femur.*

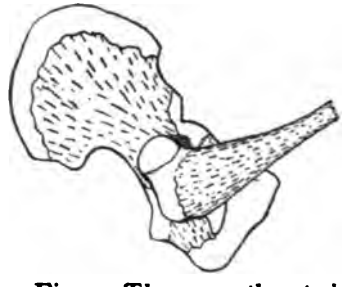

Fig. 4. *The same; the capsule removed.*

this reduction has been effected and the limb extended, the front part of the capsule is tense, whilst the upper part becomes folded above the head and neck of the bone (Fig. 5). In this case, then, a true reduction was easily produced. The head of the femur is somewhat flattened posteriorly, and the ligamentum teres is flattened and elongated (Fig. 6). The whole os inno-

Fig. 5. *The same; the dislocation reduced and the thigh extended.*

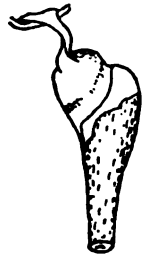

Fig. 6. *The same; the head of the femur and the ligamentum teres from behind.*

[1] These figures are taken, by kind permission of Messrs. Longmans, Green & Co., from the author's *Surgical Pathology and Principles*, 1897.

minatum is abnormal in form; the acetabulum is narrow and pear-shaped; the cotyloid ligament is flattened against the upper part of the acetabulum (Figs. 7 and 8).

Fig. 7. *The same; the os innominatum and the acetabulum.*

Fig. 8. *Normal os innominatum at birth, for comparison.*

I do not doubt that if the deformity were discovered soon after birth—and its presence may be inferred from the existence of an over-flexed position of the thighs, such as is seen in breech-presentations at birth, and a tendency for the child spontaneously to assume that position after birth—treatment could be successfully carried out without any operative measures, the limb being kept abducted, hyperextended, and inverted by a light apparatus and daily manipulations (rotation with pressure of the head of the bone into the acetabulum). When walking is begun the affected limb or limbs should then be kept in the abducted position. As a rule, however, the deformity is not discovered till the child is two or three years old. By this time secondary changes in the form of the capsule are taking place; the lower part of the capsule is becoming narrower and the difficulty of a true reduction is increasing.

The flattening of the cotyloid ligament against the upper part of the acetabulum is explained by the abnormal position of the head of the femur. It explains the slight degree of resistance to upward displacement usually observed after Lorenz's operation has been successfully carried out. The cotyloid ligament may become thickened so that it almost completely fills the shallow acetabulum. This feature was present in a specimen shown by Mr. Openshaw.[1] It has

[1] T. H. Openshaw, Clinical Society of London, January 9, 1903.

occurred to me that in cases where Lorenz's operation has been carried out, but a firm joint has not resulted, it would be easy and safe to open the joint by making a single incision along the upper edge of the Y-ligament; raising the cotyloid ligament and, if necessary, some of the periosteum to which it is attached; then placing the head of the bone beneath the tissues thus raised up, and shortening and thickening the thin upper part of the capsule by means of a running silk suture. This would not involve any removal of articular cartilage either from the acetabulum or the head of the femur, and thus any painful stiffness would be avoided, and a secure articulation effected. If scrupulous asepsis were observed, the operation would be free from danger at or after four years of age, always supposing that Lorenz's manipulative operation had been performed as a preliminary.

The probability is that in young children the reduction is a complete one. Skiagraphs of successful cases also support this view. Two recent anatomical observations, quoted by Bradford,[1] are of interest. Cathala and Veau[2] report the case of a child, aged 4, who died from diphtheria one month after reduction. The cotyloid cavity was well shaped with well-marked borders. The round ligament was present. The femoral head was small. There was no hour-glass contraction of the capsule preventing passage of the head. The capsule was unusually thick in front, but was thin behind The pectineus muscle was almost completely torn. Josserand[3] reports 50 cases of reduction by Lorenz's method. In one, death from some independent cause, occurred four months after operation. An autopsy showed that in this case also the reduction was anatomically complete. Thus in some cases Lorenz's operation produces a true reduction of the dislocation; in other cases the operation results in the head of the bone moving forwards above the acetabulum; many of this latter group of cases give very good physiological results.

*Limits of Age.*—With the experience of over 1,000 cases, Lorenz has arrived at the conclusion that in unilateral cases the average age-limit for successful treatment is from 9 to 10

[1] E. H. Bradford, *Boston Med. Journ.*

[2] Cathala and Veau, *Soc. Anat.*, Octobre, 1901, p. 540.

[3] Josserand, *Ann. de Méd. et Chir. Infant*, 1901, p. 773.

## Plate XLI.

Figs. 9, 10, and 11. *Three views of a patient, aged 15, with untreated bilateral congenital dislocation of the hips.*

years, and in bilateral cases from 6 to 7 years. These limits have frequently been exceeded, and after prolonged treatment by weight-extension and tenotomies cases that at first appear to be unpromising may sometimes be successfully dealt with. In this way Lorenz has reduced an unilateral displacement in a woman aged 23. When patients are nearing the age-limit preparatory treatment is required. (*See* Case 3.)

*Case* 3.—Elsie ——, aged 10, a rather delicate girl with congenital dislocation of the left hip. There was 2¾ inches of shortening when the patient lay down, and over 3 inches when she was standing. The left great trochanter was prominent owing to the neck of the femur being well developed. There was marked lordosis. Professor Lorenz kindly saw the patient and considered her case with Dr. Parsons Smith and myself. He recommended several stretchings of muscles, as if for operation, and subcutaneous division of the muscles below the anterior superior spine, and of the hamstrings.

*Natural Termination.*—It is not irrelevant to consider briefly what is the course of these cases if the patients are left untreated. The ordinary condition at the age of 15 of a case of untreated double dislocation is shown in Figs.[1] 9, 10, and 11, taken from a patient under my care.

*Case* 4.—Annie ——, aged 15: double congenital hip-dislocation. The trochanters are well above Nélaton's line, and the thighs are adducted so much that the patient can only separate the knees by a few inches. A considerable gap is seen between the upper part of the thighs. There is marked lordosis, the patient walks with the usual rolling movement, and is easily tired.

By gymnastic treatment of the lower limbs the power of abduction has been increased, and by an antero-posterior spinal support the lordosis has been greatly diminished. The patient now walks better and with greater ease.

Such patients are severely handicapped for life even after everything possible in the way of palliative treatment has been carried out. It is inadvisable for them to marry. They are regarded as invalids in a family. They are debarred from most

[1] For these figures we are indebted to the kindness of Messrs. Rose and Carless and to Messrs. Baillière, Tindall, and Cox; they are taken from Rose and Carless's *Manual of Surgery*. 5th edition.

athletic pursuits, though some can bicycle and dance. Towards middle age the lordosis tends to increase and the spine to become painful, a condition often requiring mechanical support. The dislocated hip-joint is prone to attacks of rheumatoid arthritis. Nearly all these miseries can certainly be prevented by Lorenz's treatment; for, even if permanent reduction is not effected, the head of the bone becomes fixed below the anterior superior spine, and the tendency to lordosis and much of the waddling is abolished.

As an example of a more favourable natural condition—a unilateral case with the head of the bone forward as seen in Fig. 12—the following case may be quoted:—

*Case* 5.—Margaret ——, aged 4 years and 10 months: unilateral dislocation; 1½ inch shortening. The head of the bone can be felt below and behind the anterior superior spine. There is no lordosis (Fig. 12). A skiagraph taken with the foot *inverted*[1] is reproduced in Fig. 13.

This patient I operated upon on February 9, the reduction being completely successful and readily effected. Had she been left to herself the relative shortening of the limb would certainly have increased, and her condition might have become similar to that described above under Case 4. The difficulty of reduction would certainly have increased with time.

The shortening of the limb in unilateral cases may be looked on as a natural tendency to limit the deformity:—it causes a downward tilt of the pelvis toward the affected side, or in other words it causes the patient to walk with the affected limb in the abducted position. It is a common practice to prescribe a high boot in these cases. This, as far as the condition of the joint is concerned, is a distinct

[1] If this skiagraph had been taken with the foot pointing forwards a very different picture would have been obtained—no part of the femoral neck would have been seen, but part of the epiphysis would have appeared over the upper end of the femur, which would have seemed not to be in contact with the ilium. The fact that the great majority of cases of congenital dislocation of the hip only give satisfactory X-ray pictures when the limb is inverted has been pointed out by W. Walther (*see* a notice by the writer in THE PRACTITIONER, September, 1902). It was also demonstrated to me by Mr. Robert Jones in a collection of skiagraphs made for him by Dr. David Morgan. It proves that in the majority of these cases the head of the bone is directed forwards and not backwards, as once was held to be the case.

Fig. 12. *A patient, aged 4½, with unilateral congenital dislocation of the hip.*

Fig. 13.

*Skiagraph of the pelvis and hips of the patient shown in* Fig. 12.

disadvantage, abolishing the abduction and so increasing the tendency to upward displacement of the femur.

*The Dangers of the Operation.*—These are entirely due to treatment being neglected until the patient has neared the age-limit for the operation. In children up to the age of five or six years there is practically no danger. In older patients Lorenz records one case in which gangrene of the limb ensued from pressure of the replaced head of the femur on the back of the femoral artery. In several cases the neck of the femur has been broken, or the epiphysis separated; when this has occurred the plan recommended by Lorenz is to wait a year for repair and consolidation of the parts, and then to reduce the dislocation as if nothing had happened. In a few cases, in which much shortening was present, the anterior crural and the external popliteal nerve, as I was informed by Dr. Müller, have been injured. Hoffa has recorded a fatality from convulsions and shock-like symptoms. It is questionable whether this untimely event can be attributed to the operation.

*The proper Attitude of the Medical Profession.*—It remains only to consider what course the profession should pursue with regard to children afflicted with this congenital dislocation. On the subject of Lorenz's treatment one of our medical journals[1] has recently published remarks which include the following:—"It is true that the risks of sepsis and hæmorrhage are removed by this operation; but the tissues around the joint are violently lacerated . . . . . A judicious hesitancy should characterise the surgical mind until we have more certain data on which to found an opinion." With regard to the first part of this judgment it must be observed that the mention of the parts "around the joint" as being lacerated shows that the writer himself was unfamiliar with the operation. It is only some of the adductors, which are on the inner aspect of the limb and not around the joint, that are "lacerated"—and that not "violently." The successive hackings with the hand on the tense adductors, gradually produce a real separation of the fibres of the adductor longus, and in some cases of the adjoining fibres of other muscles of the adductor group. The term "violent laceration" is, however, not appropriate, and in patients who are subjected

[1] *Lancet*, Feb. 7, 1903, p. 382.

to treatment at the most suitable age—that is, up to five or six years—it is altogether misleading. There is, with regard to these cases, certainly no urgency such as exists in many surgical conditions, but it is hard to see what more "certain data" can ever be forthcoming than are already to hand for those who chose to seek. Many completely successful results, verified by skiagrams and the evidence of unimpeachable witnesses, have been published and shown at professional gatherings in Europe and America. It is most important that the patients now being operated on in England, with the benefit of the improved methods which Lorenz has patiently taught us, should be kept carefully in view, and that the results should be published and, where possible, demonstrated in about two years' time, because ocular demonstration is more convincing than records. But how many are the patients who, if kept waiting for two years with a "judicious hesitancy," will have attained or passed the average age-limit for the success of the treatment—it is more than an operation—or will have passed the time when the operative part of the process can be performed with ease and safety and will thus be subjected to wholly unnecessary risks? The opinion of a surgeon whose treatment of congenital hip-dislocation has been largely superseded by that of Lorenz, and who is unlikely to be biassed in favour of the latter's method, is as follows:—

"In any case Lorenz's method is a great advance, for the chief thing is that the functional result of the method is for the most part highly satisfactory. The children with unilateral dislocation often walk so well that one can scarcely detect a trace of their former defect, and those with double dislocation lose their lordosis and walk at the most with a trifling swaying of the trunk." [1]

To sum up: Lorenz's method of treating congenital dislocation of the hip is based on correct anatomical and physiological grounds; it is the outcome of an exceptional experience both of open and subcutaneous operating; in a considerable proportion of cases it gives a perfect anatomical and physiological result (*i.e.*, it cures a condition hitherto deemed incurable); in a still greater number of cases it affords

[1] Hoffa, *Orthopædic Surgery*, 1899, p. 579.

a permanent functional improvement that relieves the patient of the grievous disabilities which the deformity usually entails if left untreated. In the remaining cases in which the method fails to give a firm articulation placed anteriorly, the manipulative operation of Lorenz is a necessary preliminary to any subsequent treatment by open operation that may be undertaken.

The manipulative operation is free from danger save when treatment has been too long delayed.

# EXPERIENCES OF AN EPIDEMIC OF CEREBRO-SPINAL MENINGITIS.

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Epidemic cerebro-spinal meningitis occurred in Ireland in the years 1846, 1866–67, and 1886-87–88. The Registrar-General's reports show that in 1886–87–88 the mortality for all Ireland from this disease was respectively 133, 107, and 111 for each of the three years. During the year 1900 cerebro-spinal meningitis again appeared in epidemic form, chiefly affecting Dublin and its neighbourhood. The Irish mortality from the disease in 1900 was 204 ; in the succeeding year it dropped to 88.

In the epidemic of 1900 and the following year 40 cases of cerebro-spinal meningitis were treated in the Hardwicke Fever Hospital, Dublin. In the absence of reasonably conclusive evidence as to the true nature of four of these, which were probably very mild cases, I have deemed it more advisable to exclude them, and base the following description, therefore, upon observation of 36 instances of the disease. Most of the patients were between the ages of 5 and 20 years. Six were over 20, 3 under 5. The oldest was 47, the youngest 2 years. Females were attacked more frequently than males in the proportion of 2 to 1. The hospital records afford but one instance of the disease affecting two inmates of the same house. On no occasion did the disease spread in the hospital to other patients or to those attending the sick.

No successful attempt was made to define an incubation-period.

*The Onset* was definite and sufficiently constant in character to be a serviceable aid in diagnosis. In the large majority the symptoms began quite abruptly with severe headache, pain and stiffness in the back of the neck, vomiting, shivering

convulsions in children, varying degrees of prostration, and elevation of temperature. To this list may be added vertigo, which in a few instances was very marked at the onset. Such was the case of a boy, aged 9, who, on his way home from school one day, was seized with "giddiness," so that he fell to the ground. On regaining his feet he again fell and had to be carried home, where, shortly after his arrival, he vomited and complained of violent headache. On the fifth day of his illness he was brought to hospital in a state of profound coma, and died soon afterwards. An autopsy confirmed the diagnosis. Early vertigo was interesting in the light of post-mortem evidence, which showed that the cerebellar meninges were usually the seat of more intense inflammation than those elsewhere. Sore-throat, though not constant, was complained of at the onset with noteworthy frequency. Some patients at the time they came under observation still had catarrhal inflammation of the mucous membrane of the tonsils and fauces; in one of them enlarged and tender cervical lymph-nodes were present. It may be remarked here that the possibility of the throat affording the portal of entrance of the specific microörganism suggested itself. Only rarely did prodromal symptoms precede the onset. Several patients, however, appeared to have had a preliminary abortive onset, which passed away soon, to reappear with greater severity in one or two days.

Having described the onset in this general manner, I find myself baffled in any attempt to formulate any description of the subsequent course of the fever that might, at all fairly, be styled "typical." The cases under analysis showed the widest diversity in duration and severity. Many of the signs and symptoms observed were inconstant, and even those that were frequently present varied most remarkably as to the time of their appearance after the onset, their degree, and their duration. So irregular was the course that the day of illness afforded little or no guidance as to the probable further length, or the prognosis, of any particular case. Conversely, when a history was unascertainable (as from children, or those admitted in a state of stupor), the signs present were most unreliable indications of the previous duration of the attack. A particular case might reach its acme in hours, days, weeks, or months. The following figures emphasise this point by giving the day

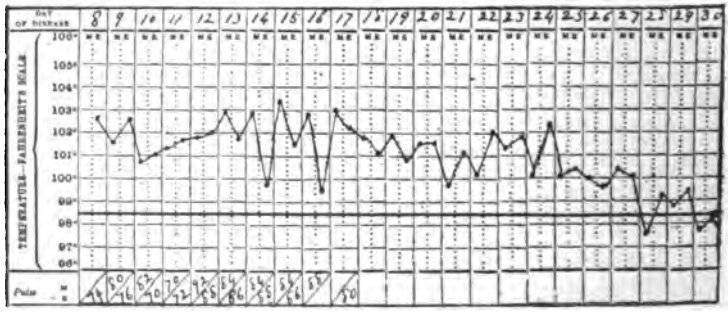
of death of twelve patients, the onset of whose symptoms could be accurately determined :—

| Day of Death. | Age. | Day of Death. | Age. |
|---|---|---|---|
| 1st - - | 2 years. | 17th - - | 20 years. |
| 2nd - - | 4 „ | 46th - - | 9 „ |
| 5th - - | 9 „ | 56th - - | 36 „ |
| 5th - - | 7 „ | 63rd - - | 47 „ |
| 9th - - | 7 „ | 113th - - | 15 „ |
| 16th - - | 41 „ | 246th - - | 16 „ |

It is difficult to state the duration of the disease accurately, convalescence was usually so tedious in those that recovered, and so often interrupted. It may be said, however, that the duration in cases of recovery varied almost as much as in the above fatal ones. Deeming it misleading to describe a "typical case," and not wishing to multiply the already numerous "varieties" in the literature of the subject, I think it may be more useful to discuss *seriatim* the most constant and prominent clinical phenomena with a view to affording some practical information which may be an aid in diagnosis to any reader under whose notice this erratic disease may, perchance, not yet have fallen.

*Pyrexia.*—The course of temperature was characterised mainly by its irregularity and its varying duration. Some pyrexia appeared to be constant at the outset, the thermometer registering from 100° to 103° F. In mild cases it only persisted for a few days; in severe attacks, if not terminating fatally,

CHART I.

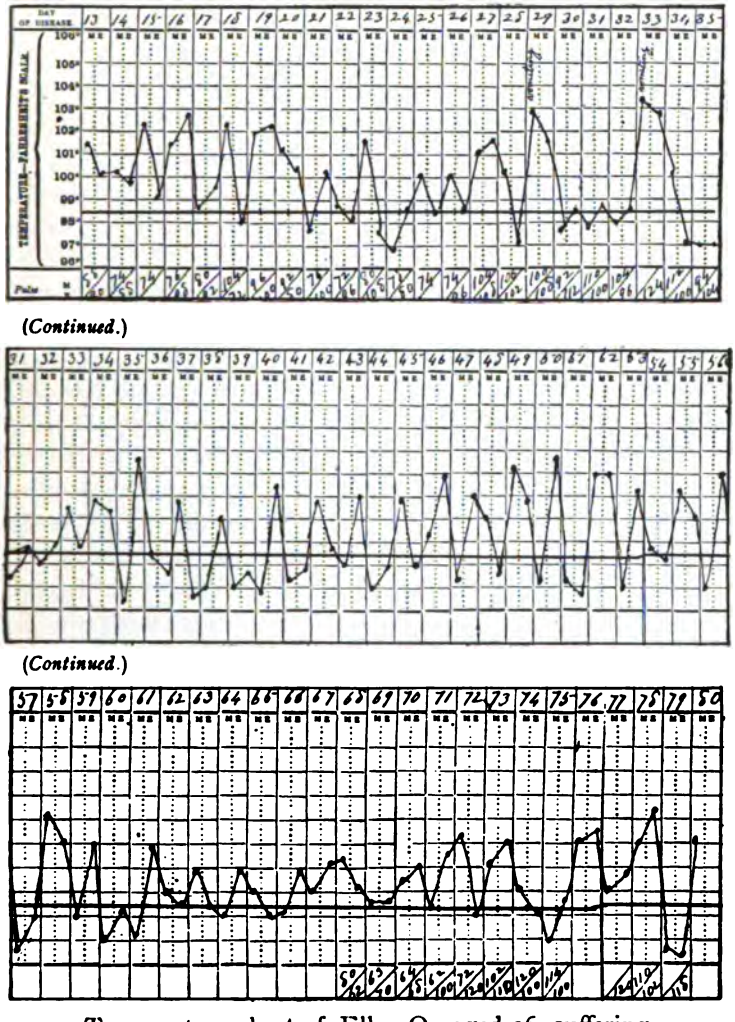


Margaret R., age 29, epidemic cerebro-spinal meningitis, ending in recovery.

**Chart showing morning temperature frequently higher than that in the evening.**

very much longer. To mention extremes, two mild cases had normal temperatures by the 5th day, two severe cases—one fatal, the other recovering—had elevated temperatures for 80 and 70 days respectively. With the ordinary observations taken every 12 hours, the records frequently exhibited an

CHART II.




(*Continued.*)

(*Continued.*)

Temperature-chart of Ellen O., aged 36, suffering from epidemic cerebro-spinal meningitis. Death on 80th day.

Chart showing tendency to periodicity.

"inverse" pyrexia, *i.e.*, greater elevation in the morning than in the evening. (*See* Chart I.) In no case did this persist throughout the fever. Of course there is nothing characteristic of cerebro-spinal meningitis in inverse temperature; on the other hand, I have not seen it mentioned by writers on the subject, whereas, apart from indescribable irregularity, it was the most striking feature of some of the charts. It may also occur in tubercular meningitis, and in meningitis secondary to suppuration of the middle ear, as noted from personal observation. It is probably to be accounted for in some cases by rapid, irregular pyrexial fluctuations. The sign is of value in excluding enteric fever when this disease is suspected. The charts exhibited instances of the following previously described types of pyrexia :—The "enteric" type showing a continuously high temperature, defervescing by lysis; the "tertian" type showing a tendency to pyrexia only every second day; and the intermittent and remittent types showing morning falls to below, or approaching, normal. No single chart showed continuity of any of these in a pure state, except the enteric type. Commonly various types were intermingled on the same chart. Recrudescences were frequent. The fact that pyrexia had subsided was by no means a trustworthy indication of speedy improvement of other symptoms, or even of a favourable issue.

*Sensory Nervous Symptoms.*—In no case was headache absent; in the majority it was intense, constituting the most prominent complaint. Experience of this epidemic would prevent one from laying diagnostic stress on the situation of the pain. Though usually described in text-books as being occipital, it was in my experience more frequently frontal. No doubt some confusion has arisen between pain which is strictly headache, and pain in the region of the cervical spine so often complained of. On being asked to demonstrate the situation of their pain, patients would place their hands on their foreheads and on the backs of their necks. The headache was very persistent, lasting in severe cases through phases of semi-stupor till complete unconsciousness ensued, and often remaining long into convalescence; in fact, in those that recovered, it was often the alpha and omega of the symptoms. As in tubercular meningitis, the pain in the head was subject

to unaccountable, acute, and violent exacerbations, causing the sufferer to moan in a most distressing manner. Only in children was the "hydrocephalic cry" approached. Such exacerbations were, as a rule, accompanied by vomiting, increased elevation of temperature, and quickening of the pulse. My colleague, Dr. O'Carroll, observed that deep pressure in the sub-occipital space elicited pain, and this to a greater degree, in his opinion, than in tubercular meningitis.

Pain was by no means limited to the head and neck, but tended to invade the spine and to radiate generally. Not uncommonly hyperæsthesia of the skin would be demonstrated, the limitations of which were sometimes well defined. It usually appeared first in the posterior cervical region and along the spine, then over the trunk, and down the limbs for variable distances. One patient, though perfectly conscious at the time, appeared anæsthetic at the back of the neck and over the shoulders behind. These sensory phenomena were doubtless due to inflamed meninges affecting the posterior roots of the spinal nerves. Why they should have commenced at the spine and tended to radiate peripherally is a question of interest and diagnostic importance. A satisfactory explanation can be given on the assumption that sensory nerve-fibres on entering a nerve-trunk lie superficially (nearest the peri-neurium) till they are overlapped by other nerve fibres joining the common trunk more proximally. If this be so, it is easy to understand how inflamed spinal meninges by superficially irritating posterior nerve-roots, might first produce sensory disturbances in the distribution of the different nerves which last joined the corresponding trunks without affecting the entire distribution of the nerve-roots. Be this as it may, pain, hyperæsthesia, or anæsthesia, commencing in the skin over the spine and radiating from that point, is a help in distinguishing the objective sensory signs of spinal meningitis from those of peripheral neuritis. In the latter the same phenomena appear first peripherally. Again, in lesions of the central nervous system they affect the entire distribution of the nerve-roots implicated in the lesion. Besides the pain associated with hyperæsthesia, other vague pains, such as may occur in any severe fever, were common.

*Motor Symptoms.*—Tonic spasm of muscles was present to

some extent in all cases. In some it merely affected the muscles of the neck, causing retraction of the head with resistance and pain on passive flexion. In others the spinal muscles were involved, so as to produce straightening of the spine (orthotonos); but arching of the back sufficient to warrant the term opisthotonos was not seen. In bad cases the rigidity tended to become universal, as shown by scaphoid abdomen and flexion of the hips and knees, and of the arms. In this connection it may be remarked that a persistent facial expression of pain was observed.

Kernig's sign was present without exception. Usually it appeared early, but sometimes it was delayed—in one case till the fifth week. It was considered more advisable to test for this sign in bed instead of seating the patient in a chair, as movement was prone to aggravate the headache. With the patient lying on one side (the usual decubitus) the femur was brought to a right angle with the body, then the leg slowly extended. With the femur in this position the extension was usually resisted by spasm of the flexors of the knee when the leg reached an angle of 105° to 110°. The spasm was attended by such pain in the hamstring muscles and knee that a patient, though semi-comatose, would rouse up with an agonised cry. When the femur was in a line with the trunk, full extension of the knee would be passively or actively performed with ease and freedom from pain. On the whole Kernig's sign would appear to be a fairly reliable indication of spinal meningitis, not necessarily specific cerebro-spinal, for I have observed it in tubercular and in secondary meningitis. Furthermore, personal experience has shown that this sign may be present in children suffering from severe enteric fever, accompanied by rigidity and pain on passive flexion of the neck. In fact, enteric fever in children may assume such a strikingly meningeal aspect that, unaided by Widal's reaction, its certain diagnosis from cerebro-spinal fever may present great difficulty. It was found profitable to bear in mind the following points in testing for Kernig's sign:—(*a*) The phenomenon was sometimes more marked in one leg than the other. When doubt existed as to its presence or absence, a difference between the two sides might help to settle the question. (*b*) In any nervous disease in which the legs are kept

sufficiently long in a flexed position for more or less contracture to develop, there is pain and resistance to extension of the leg, even before a right angle is reached. This does not constitute Kernig's sign. (*c*) Normally in those who have not practised the feat, full extension of the leg with the femur at right angles to the trunk is difficult and painful.

Kernig's sign may, it was noted, be present with normal, exaggerated, or lost patellar reflex. In a few cases a corresponding sign was present in the arms, namely, resistance and pain in the biceps muscle on passively extending the forearm.

Other disturbances noted were ptosis, strabismus, monoplegias, conjugate deviation of the head and eyes, and choreïform movements.

*Reflexes.*—The tendon-reflexes, as estimated chiefly by the knee-jerks, almost invariably disappeared sooner or later in the course of the disease. Only in a few instances were they found exaggerated before they disappeared, and only once was this accompanied by ankle-clonus. One patient, aged 11, retained the increased patellar reflexes throughout a rather severe illness of six weeks' duration. Babinski's toe-extension phenomenon was present in two patients, aged 7 and 17, from both of whom, at the time, the patellar reflexes were absent. The plantar, as other superficial reflexes, were less constantly diminished or lost than the deep reflexes. The pharyngeal reflex was not tested systematically, but was sometimes lost. On the whole, loss of the knee-jerks would appear to be the reflex disturbance of greatest diagnostic value.

*Delirium and Coma.*—Delirium presented itself to some extent in all but the mildest forms of the disease. It was characterised by perpetual restlessness, turning in bed, and arranging and reärranging of the bed-clothes in some cases. It often took the form of unremitting crying or whimpering. Some of the patients for long periods appeared to have their delirium dominated by a single fixed desire, as instanced by a girl who for weeks cried out repeatedly "I want to go home to my mother." Another for a long time continually whined for bread, which, when given, she would devour ravenously in large quantities. Delirium gradually merged into coma of varying depth, taking one or other of two forms; either

coma indicative of cerebral compression, or coma resembling the so-called "typhoid state" as seen in other fevers. In the former, irregular respiration, slow pulse, and dilated, irresponsive pupils, commonly accompanied the unconsciousness, the sufferer assuming a "curled-up" attitude. "Coma vigil" was strikingly pronounced at times.

Regarding duration, it may be said that coma may last for days or months; and, though it afforded a good standard for estimating the severity of a case, yet even when prolonged in children and young adults, it was not of necessity fatal. Temporary remissions of the unconsciousness were often very noticeable.

*The Eyes.* — Dr. R. D. Joyce, Ophthalmologist to the hospitals, kindly examined the eyes. Very frequently some abnormality was detected, the following having all been noted; dilatation of the pupils with lost or diminished power of contracting to light and accommodation; unequally dilated pupils; ptosis; lateral nystagmus; and anæsthesia of the conjunctiva. Only twice was abnormal myosis observed; one of these patients was a man aged 47, who at the time was semi-conscious (pulse 72, temp. 101° F.); the other, a woman aged 29, on the thirteenth day of her illness (pulse 80, temp. 101·2° F.). The myosis lasted only a few days in each case. Ophthalmoscopic examinations afforded surprisingly negative results. Even in severe cases the fundus of the eye was often normal throughout the disease. Marked optic neuritis was never detected, the usual change being merely projection and hyperæmia of the optic papilla, and dilatation of the retinal veins.

*The Ears.*—Deafness, other than that accompanying coma, did not appear as commonly as the records of other epidemics imply. Complete loss of hearing, however, was noted in one fatal case; and in another which recovered, the right ear remained deaf as long as the patient continued under observation.

*Cutaneous Eruptions.*—Herpes or erythema were common early in the disease; sometimes they existed concurrently. The herpes was most commonly labial or naso-labial, but was also observed on the cheek, ear, and neck. The erythema was of a patchy, bright-red variety, usually with well-defined

limits. It was only occasionally symmetrical, and was noted on the legs, arms, shoulders, neck and face. In two patients bullous eruptions appeared on the feet, in one on the hands. Only twice were purpuric spots observed; in neither instance were they numerous; in both they were most abundant on the trunk, and only appeared a few days before death. I am inclined to the opinion that the cutaneous eruptions, as seen in this epidemic (with the exception of purpuric. spots), were due to irritation of sensory nerves-roots and not to a poison in the circulation as in other specific fevers, for the following reasons: — (*a*) Their general lack of symmetry; (*b*) their diversity of type; (*c*) their variability of site; (*d*) their inconstancy; (*e*) the fact that in a few cases the eruption corresponded accurately with a zone of hyperæsthesia. Probably purpuric spots or larger ecchymoses, so constant in other epidemics, are manifestations of a profound toxæmia.

*The Pulse.*—Like so many of the other features of epidemic cerebro-spinal meningitis, the pulse showed no constant characteristics. Our clinical charts show that in the majority of cases the pulse was abnormally slow at some stage of the disease, in the minority rapid throughout. The slowness was either absolute, or relative to the temperature. It could not always be considered an indication of cerebral compression, inasmuch as it was noted in patients who, at the time, were intellectually clear, whose pupils were normal, and in whom the ophthalmoscope showed no abnormality. Furthermore, a slow pulse was sometimes evident early in the disease, even before delirium had appeared. The phenomenon may be accounted for on the supposition that the cardio-inhibitory nerves were sometimes stimulated at their exit from the medulla by the inflamed meninges. Were the bradycardia due to a specific poison circulating through the cerebral cardiac centres, or directly affecting the heart or its ganglia, greater uniformity in the disturbance of the pulse-rate might be expected. No doubt, slow pulse in some patients was due to increased pressure in the cerebral ventricles, as it sometimes, but not invariably, accompanied other manifestations of that condition. The pulse was small and compressible; which characters, together with cold, livid extremities, in many cases indicated feeble circulation,

Amongst more miscellaneous clinical observations made during the epidemic were the following: an extraordinary degree of emaciation in many patients despite generous diet; enteric-like stools in two; palpable enlargement of the spleen in one. Occasional vomiting of cerebral character occurred in many cases throughout the whole course of the fever.

*Treatment.*—This was mainly directed to the alleviation of headache. Briefly, it may be stated that the only sedative which produced decided results was morphia given hypodermically. It was well borne, even in repeated doses. Ice to the head only occasionally gave more than temporary relief. When distinct evidence of cerebral compression was present, the withdrawal of 8 or 10 cc. of cerebro-spinal fluid by lumbar puncture was performed. The result was, in a few instances, strikingly good, if transient; coma diminished, respiration became regular, and the pupils more responsive to light.

*Mortality.*—Of the 36 cases which form the subject of this paper, 14 died—a mortality of 38 per cent. approximately.

*Morbid Anatomy.*—Thirteen autopsies were performed—a sufficient number to show that the extent of the macroscopic post-mortem changes varied greatly, and were sometimes apparently disproportional to the length and severity of the fatal attack. Regarding the brain, the inflammation of the pia-arachnoid was usually best marked at the base, tending to spread over the cortex. The situation where the severest inflammation was most frequently found was the superior surface of the cerebellum. The cerebral pia-arachnoid might merely show hyperæmia and increased quantity of fluid, or patches here and there of fibrino-purulent exudation; or the surface of the brain might be practically covered with a layer of pus, thickest over the sulci. The case of a child, aged 2 years, who died within 24 hours of the onset of the disease, and over whose cerebellum pus was found *post mortem* to have already formed, illustrates how intense the inflammation may be. The lateral ventricles were usually found distended to some degree with clear or slightly-turbid fluid. Once the right lateral ventricle was lined by a distinct layer of pus without being distended.

The spinal meninges generally contained excess of cerebro-spinal fluid. The changes in the pia-arachnoid were similar to

those found in the brain. Contrary to the usual description, it was not found that the posterior surface of the cord suffered more severely than the anterior. The inflammation was sometimes more intense in the lower dorsal and lumbar regions than in the cervical.

*Bacteriology.*—Dr. H. C. Earl, Pathologist to the hospitals, bacteriologically examined the inflammatory exudations found *post mortem*, and the fluid taken clinically by lumbar puncture. The Diplococcus intracellularis meningitidis was invariably present, except in the case mentioned below. This organism grew best on Lœffler's blood-serum, forming, after two days' growth, a white, opaque, glistening uniform colony, of a viscid, stringy consistence. The organism also grew well on glycerine-agar. On cover-glass preparations made from fluid taken by lumbar puncture the organism was as frequently seen free as intracellular. It resembled the gonococcus in its general shape, the opposing surfaces of the diplococci being flattened. No capsules could be demonstrated. Variability in size was conspicuous. The organism refused to stain by Gram's method. It grew upon many media on which the gonococcus would not grow.

The following is an interesting demonstration of the utility of an examination of cerebro-spinal fluid as a means of diagnosis. During the epidemic Dr. Earl was given some fluid drawn by lumbar puncture from a case of supposed cerebro-spinal fever. Neither the Diplococcus intracellularis meningitidis nor the tubercle-bacillus were to be found in it, yet Dr. Earl reported that the case was probably one of tubercular meningitis, and such it was proved to be *post mortem*. This opinion was based on the fact that the cellular elements preponderating in tubercular spinal fluid are lymphocytes, whereas multinuclear leucocytes are most in evidence in cases of cerebro-spinal meningitis.

Of the two following cases, the first was under the care of Dr. O'Carroll, to whom I am indebted for the use of the notes on his patients, as also for much helpful advice in the compilation of this paper. Both cases illustrate the great length to which a fatal issue from cerebro-spinal meningitis may be postponed.

*Case I.*—Margaret E., aged 15, previously healthy, was

admitted to the Hardwicke Hospital on September 20, 1901, that day being the twelfth of an attack of cerebro-spinal meningitis. By the first week of October stupor had supervened—a condition which persisted, with but slight variations, till the day of her death on January 11, 1902. The following notes were taken by Dr. O'Carroll :—October 11. Patient is lying in a condition suggestive of something between stupor and imbecility, with eyes widely open, dilated pupils, and occasional partial winking (*stupor vigil*). The head is twitched to the left three or four times in the minute. The right shoulder is raised from the bed by a convulsive movement still more frequently. She moves both arms about in a semi-purposive manner; for instance, she scratches her head occasionally. The legs are also moved, the right more than the left. The movements generally are choreïform. The knee-jerks are subnormal. Kernig's sign is present, but not well marked.

October 16. She appears to take some notice of persons around her.

October 26. Kernig's sign has become well marked. The arms are rather rigid to passive movement. November 17. No change for the past fortnight, except that she seems a little more intelligent. She gives no sign of hearing, and never speaks.

December 16. The patient now shows signs of distress, moaning, gasping, and grinding her teeth. The pupils are widely dilated, but contract consensually to light, never, however, becoming smaller than half the corneal diameter. This seems to point to some interference with the oculo-motor nerves. At the end of inspiration she holds in her breath and then emits it in a sudden explosive expiration. Her legs have been kept for some time in a flexed position and resist extension; and the muscles can be felt to be in a state of active contraction. For the past month or more a curious feature of her intellectual condition has been that, on approaching an object, no matter what, to her mouth, she snapped at it and proceeded to bite it. She does this to a finger or a pencil.

Dr. O'Carroll about this date had arrived at the conclusion that the patient was now the subject of some gradually increasing intra-ventricular pressure. Her stupor was deepening,

the breathing was markedly explosive, and the pupils had become irresponsive to light.

On December 18 Dr. O'Carroll performed lumbar puncture. The fluid, which came away in rapid drops, contained only a slight trace of albumen and was perfectly limpid.

December 19. "The breathing is perfectly quiet. The pupils are lessened in diameter and respond slightly to light, and she moves her eyes from side to side following a person at her bedside."

A few days later the pupils resumed their condition of dilatation, without light-reflex. Dr. Joyce reported that the pupils suggested the condition of "irritation mydriasis." During ophthalmoscopic examination they moved from an original position of moderate, to a new position of greater, dilatation. The discs were normal. There was slight horizontal nystagmus when the eyes moved to the extreme left.

To quote Dr. O'Carroll's notes again :—"A condition of apparent attention on the part of the eyes, with absolute loss of hearing or speech, or both, was a striking feature at this time. In the presence of the apparently animal interest exhibited by her eyes, and the persistence of the curious tendency to open the mouth and close it on anything touching the lips, it seemed difficult to assume any more destructive process than the general ventricular hydrocephaly already guessed at."

The complete loss of hearing Dr. O'Carroll thought due to peripheral mischief in the auditory nerves determined by intraventricular pressure.

The patient remained in much the same condition till January 8, 1902, when a decided change took place. She ceased to move the eyes towards the new-comer to her bedside, and to open her mouth when it was touched. Bedsores supervened, and she died on January 11 by gradual asthenia. The course of the temperature was curious. Fever had subsided by the end of September, 1901 ; during the first half of October the temperature rose every three or four days. From the middle of October to the middle of December it remained subnormal. From December 12 till death there was persistent irregular fever. The pulse was rapid throughout, except when the temperature was subnormal.

*Necropsy.*—There was no excess of fluid in the spinal canal. The cord and its membranes appeared healthy. The brain was healthy on the surface; no pus was present. The floor of the third ventricle was bulged downwards. On opening the brain, the lateral ventricles were distended with excess of clear cerebro-spinal fluid: their floors were flattened, and the foramina of Monro enlarged. The fourth ventricle also was dilated, particularly at its lateral angles, close to the deep origins of the auditory nerves.

*Case 2.*—Bridget McG., aged 16, was admitted to the Hardwicke Hospital on March 5, 1900. Six days previously she had been suddenly seized with violent headache and pain in the neck and back. She soon complained of great weakness. On her admission the diagnosis of cerebro-spinal meningitis was made on the following evidence:—The sudden onset of the attack in a girl previously healthy; labial herpes; erythematous rash on one side of the neck; retracted head; Kernig's sign; lost knee-jerks; retained plantar reflexes; irregular pupils, the left being larger than the right and reacting less to light (the fundus in each eye was normal); and constant retching and vomiting. In the course of the next few days she became stuporous, with pulse abnormally slow, while still suffering from most violent headache and attacks of vomiting. In this condition she remained for months, her symptoms ebbing and flowing in severity. At one time she would be more intelligent, brighter, and free from pain, so that hopes of her recovery would be entertained; but disappointment always came in a day or two, when she would again become stuporous, vomit, and suffer agony from headache. On these occasions she would lie curled up in bed, with head strongly retracted, groaning from pain, and resenting the least touch or movement. She wasted to an almost incredible degree, her skin becoming harsh and dry. By the middle of May all fever had subsided, which, till then, had continued of a highly irregular type. Towards the end of July she decidedly improved, inasmuch as the stuporous condition gradually disappeared; yet she still remained helpless and rigid in the neck and legs. From July to November her main symptom was violent headache, which gradually grew less frequent and less prone to be accompanied by vomiting. Her pupils became

normal. The knee-jerks remained absent. By the end of October the patient had only regained sufficient muscular power to stand by the side of her bed with assistance. Against advice, her parents removed her from hospital in this condition on November 3, more than eight months from the onset of her illness. The day after her arrival home she died quite suddenly. No autopsy could be procured. The case is of interest as illustrating the so-called chronic type of cerebro-spinal meningitis.

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# A NOTE ON GASTRIC TETANY.

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In the January number of THE PRACTITIONER there appeared a paper upon "A Case of Gastric Dilatation and Tetany," by Dr. W. E. Carnegie Dickson, in which some very careful observations were recorded. The general view therein taken as to the serious nature, and as to the rarity, of gastric tetany is not in accord with my own experience. In my first fifty cases of gastro-enterostomy there were four patients who had suffered in a slighter or graver degree from gastric tetany. In three of these the tetany did not mean more than painful cramps of the legs and thighs, or of the hands, generally experienced during the early hours of the night. In one case, the patient, a man aged 36, said that his seizures of cramp came on within a few moments of an attack of vomiting. This patient had a dilated and actively contracting stomach, the result of pyloric stenosis and induration. During the day he very rarely vomited. The feelings of sickness and gastric uneasiness were first experienced after he had been lying down in bed for about half an hour. They culminated generally in the vomiting of a large quantity of "sour" fluid; and almost simultaneously severe cramps were felt in the calf-muscles of both sides, sometimes in the thighs, and rarely in the buttocks. Often during the day he suffered from tingling in the hands and numbness. Free hydrochloric acid was present in the vomit.

In three other cases, all in men, severe cramps in the muscles of the arms, forearms, abdomen, thighs and legs were present. In none of these, however, was a complaint made by the patients spontaneously; it was only when a leading question was put that the cramps were mentioned. Clearly there was no association in the minds of the patients between the gastric disorder and the muscular spasm.

ost severe case that I have had under my care was
ng :—
male, aged 59, had suffered for two and a half years
of appetite, "indigestion," and flatulence. He had
acks of pain, limited to the upper right quadrant of
en, followed by vomiting; four stones in weight had
On two occasions there had been hæmatemesis,
ne occasion copious melæna. He had been under
medical treatment for months without benefit.
amination it was found that the stomach descended
wo inches of the pubes and was actively contracting.
contraction could be elicited at any time by a gentle
the stomach. There had never been any muscular
the extremities.
er to prepare the patient for operation and to obtain
nts for examination, the stomach was emptied and
ut with tepid boiled water. Within a quarter of an
patient had a very severe attack of tetany. The
earms, abdominal muscles, muscles of the neck, and,
y, the muscles of the leg were affected. The pain
sing, and the patient expressed a hope that his
would speedily end in death. Associated with the
as a condition of marked lividity of the face and
s. The hands and wrists looked as though an
bandage had been loosely applied round the fore-
ey were slightly swollen and turgid, and of a
rple colour. The "accoucheur's hand" was repro-
t there was no affection of the arms above the
A hypodermic injection of morphine was administered
pain. The next day the stomach was again washed
a similar, though much less serious, result. There
ual degree of lividity of the face and hands, but only
and very slightly the neck-muscles, were affected
sm.
llowing day the abdomen was opened and a hard
he pylorus was found. This was almost certainly
ceration with great resulting induration. There was
sion to, and thickening of, the head of the pancreas.
ch was enormously dilated and much hypertrophied.
or gastro-enterostomy was performed on April 29,

1901. By June 26 the patient had gained 31 pounds in weight, and was able to take food as well as ever. There had been no signs of lividity or spasm. In December, 1901, the patient died of pneumonia.

No patient could have suffered more in an attack of gastric tetany than this man. The attack was curtailed by the injection of morphine, and there was only one slight repetition. Nevertheless it was a genuine case, in my opinion, of gastric tetany.

The point which I desire to emphasise in this note is that gastric tetany is not the rare or the serious disease which has been described by Frankl Hochwart and others. It has almost been made a criterion of the disease that it should terminate fatally. There can, however, I think be little doubt that the symptoms in the case so ably described by Dr. Carnegie Dickson are the last expression of a long series of signs and symptoms which begin with occasional, transient, and inconspicuous attacks of cramp in the extremities.

The five cases which I have observed have all been in males; all have been due to simple diseases; in all gastro-enterostomy has been performed, and all the patients have recovered. It is probably not too much to say that the extreme form of gastric tetany is a preventable disease. The timely performance of gastro-enterostomy would remove the cause, whatever that may be, of the attacks.

# THE USE AND ABUSE OF HIGH-FREQUENCY ELECTRICITY IN MEDICINE.

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THE application of electricity of high potential and high frequency to the treatment of disease has been a good deal in evidence of late, and great uncertainty and not a little doubt as to its merits exist in the minds of medical men in this country.

The general impression about it is decidedly unfavourable, because of the way in which it is exploited by syndicates, by municipal bodies in health-resorts, by the proprietors of nursing-homes and massage-institutes, and by others in places where "treatments" are administered by unqualified people. In short, "high frequency" is one of the prominent quack methods of the day. It is advertised by means of placards in public places, and vacuum-tube electrodes and rubbishy clap-trap about the enormous voltages which can be safely applied to human beings by its aid are used to impress an ignorant public. It is being applied to the treatment of all kinds of morbid conditions, and has been recommended for the cure of cancer, of diabetes, of pulmonary phthisis, of chronic rheumatoid arthritis, of lupus, of uterine disease, of gonorrhœa, and of a host of other ailments. Under all these circumstances it is not to be wondered at if the very name of "high frequency" stinks in the nostrils of the medical profession, or that medical men who are careful of their reputation should be very reluctant to have anything to do with it. And yet it is very necessary to examine the claims of high-frequency electricity in order to discover whether there may not be something of value in it as a mode of treatment. Dr. Denoyés' book[1] affords us an opportunity of reviewing the situation, for it sets before us an impartial account of the work which

[1] Denoyés, *Les Courants de Haute fréquence; propriétés physiques, physiologiques et thérapeutiques.* Paris: Baillière et Fils. 1902. Pp. 374.

has been done with high-frequency in France, the country in which its therapeutic value has been most fully studied. The first part deals with the instruments used, and need not now detain us. In Part 2 the physiological action is considered, and in Part 3 the therapeutic effects are described. Among the physiological effects it is to be noted that a superficial analgesia or anæsthesia can be produced at the place upon which the sparks or the brush-discharge are directed, and a decrease of excitability of the nerves and muscles in the neighbourhood has been observed; there is a tendency to relaxation of the peripheral vessels, respiratory exchanges are augmented considerably (this has been denied by certain observers), and there is an increase in the production of heat; the amount of nitrogen and of phosphoric acid excreted in the urine is also increased. Dr. Denoyés admits that the great expectations of benefit to be derived from this treatment in diseases characterised by failure of nutrition have not been realised, and that the use of high-frequency in gout, rheumatism, diabetes, obesity, anæmia, and the like has not justified anticipations. In diabetes, for instance, although numerous cases have been published in which a diminution of sugar has been observed, nevertheless the patients have remained diabetic throughout. Decrease of the daily sugar in diabetes can be produced by various forms of electrical application, notably by the electric bath with sinusoidal current, but the cure of diabetes is quite another matter, and, so far, it cannot be accomplished by electrical methods of treatment.

In gout it appears that the high-frequency treatment may precipitate an acute attack. In acute rheumatism it is considered by certain experimenters to be contra-indicated. In chronic rheumatism good results have been obtained, but only after numerous applications. The author quotes Apostoli and Laguerrière for the statement that 25 or 30 applications at least are necessary, while 200 or 300 may be required.

The influence of high frequency upon tubercular disease receives special study from Dr. Denoyés. Oudin in 1899 and Doumer in 1900 reported cases of remarkable amelioration in cases of pulmonary tuberculosis from treatment by high-frequency currents; and other French observers also brought

forward corroborative evidence. Denoyés therefore instituted a series of experiments upon inoculated guinea-pigs, and the results will be found in his book. Briefly they amount to this, that the treatment by the high-frequency apparatus and especially with brush-discharge (*effluve*) seemed to exercise a retarding influence upon the progress of the disease without really arresting it. Almost all the animals were found to be tuberculous when examined after treatment, and a majority of them had died within three months from the time of inoculation. Nevertheless there are cases where the high-frequency treatment appears to have caused the disappearance of phthisical symptoms in human beings subjected to it. The results of this method of treatment upon surgical tuberculosis are at present equally inconclusive ; but Denoyés relates a case of tubercular disease of the carpus in which amelioration of the symptoms was obtained after 40 applications, and persisted up to the time when the patient was last seen, five months later.

After dealing with various other complaints and their treatment by high-frequency, Dr. Denoyés comes to the subject of anal fissure, piles, and pruritus ani ; and quotes from Doumer on the utility of high-frequency in these disorders. In the first group a cure is said to have been secured after a few applications in all the cases, nine in number. Of piles Doumer has treated 26 cases, all more or less successfully, the benefit accruing being greatest in recent and acute cases, and least when there were considerable structural alterations in the parts, or when there was much inflammation.

In diseases of the nervous system high-frequency currents have been extensively tried, and Denoyés quotes several cases of muscular atrophy in which the treatment seems to have led to a decided improvement in the condition of the affected muscles, both as to their bulk, their power, and their electrical reactions. In neuralgic pains and in neuritic affections with pain, as, for example, in sciatica, some encouraging results have been obtained. In other affections of the nervous system high frequency has not yet accomplished much.

In diseases of the skin high-frequency applications appear at their best. Psoriasis, eczema, alopecia areata, lupus vulgaris, acne vulgaris, impetigo, all seem to be decidedly benefited by direct applications of the brush-discharge or of sparks.

The conclusions which can be drawn from a study of Denoyés' book are that high-frequency treatment possesses an influence upon the course of a certain number of morbid states, that its influence for good is not of any particular degree of excellence, but that it cannot be condemned as altogether useless. In the field of general diseases dependent upon impaired or perverted nutrition it has proved decidedly disappointing, although it was just in this class of case that great things were formerly expected and predicted from the study of its physiological effects. Its action in cutaneous disorders was not anticipated at the commencement; but now that it has been discovered by experiment, one can readily see that a favourable action might reasonably have been expected in such cases, because of the directness with which the powerful electric discharges can be brought to bear upon the affected parts. The effect of the brush-discharge of a static machine in promoting the healing of ulcers has long been known to those who have studied the subject, and it is probable that the action of the high-frequency apparatus is closely comparable to that of the static machine.

A point not touched upon by Denoyés in the volume under review is the effect of high frequency upon morbid growths, such as carcinoma, sarcoma, and rodent ulcer. Evidence of a trustworthy kind is gradually accumulating which shows that there is an effect for good in diseases of this kind from treatment by electrical methods, and the benefit which has been noted seems to be obtained not only with high-frequency applications, but also with static-brush treatment, to about the same extent. The method appears to be inferior to treatment by Röntgen rays, but to be of the same essential character. Thus, lupus, rodent ulcer, superficial epithelioma, and sarcomatous nodules near the surface of the body have been recorded as decreasing in size when treated by these methods. Mr. MacIntyre, of Glasgow, has especially directed attention to the beneficial action of the brush-discharge of the static machine in such cases. When one comes to search for an explanation of these effects, and to try to learn what is the common factor which is present, one's attention becomes drawn to the probability that the active agent is to be found in the cathode-rays which are emitted from bodies which are

negatively charged. Observers agree that, with the static machine, it is the negative pole which acts most effectively. In the high-frequency apparatus the current is oscillatory, and both terminals are negative in their turn. If cathode-rays are the active agents, one can readily understand why the high-frequency treatment has succeeded best with superficial disorders, because their action would be mainly upon the surfaces upon which they were projected. In the X-ray tube the cathode-rays are able to move with astonishing velocity, and it is their impact upon the anti-cathode which generates the X-rays. The penetrating power of X-rays is notably greater than that of cathode-rays, particularly when the latter are generated in the open air at the full atmospheric pressure, as is the case when negative discharges from the terminals of a static machine or high-frequency coil are used in medical treatment. Though cathode-rays and X-rays differ from one another considerably, yet they have many points in common, and it is not impossible that their effects upon the body may be comparable. Certainly it appears probable that in the future we shall have to reckon with the action of cathode-rays in all treatment by high-potential discharges, whether they be generated by the static machine or the high-frequency coil. It is even possible that by-and-by we shall prefer to speak of "treatment by cathode-rays" where now we say treatment by "*effluve*" or by negative brush-discharges. The time is now ripe for direct experiments upon the use of cathode-rays in medical work.

# THE PHENOMENA OF TIDAL PERCUSSION AT THE APICES OF THE LUNGS, AND THEIR INTERPRETATION.

## A REPLY TO DR. PHILIP.

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IT will, I imagine, be readily admitted that of all the methods of physical examination, percussion is by far the most difficult to acquire and to interpret. Moreover, the confusion of nomenclature, which has unfortunately crept into the description of the acoustic phenomena that may be elicited by means of percussion, has helped to aggravate the attitude of uncertainty and perplexity which the tyro in the art commonly adopts towards this method of physical diagnosis. In practice these considerations have conduced to the belittlement of percussion and to the aggrandisement and glorification of auscultation, and thereby to much diagnostic error.

For these reasons, if for no other, the paper contributed to THE PRACTITIONER for January, 1903, by Dr. Philip on the "Rôle of Percussion in the Diagnosis of Early Pulmonary Tuberculosis" is most noteworthy and opportune, inasmuch as it affords an admirable and telling defence of the scope and value of the method of percussion in the physical examination of the lungs. The appearance of this paper also provides the opportunity, which I have long desired, of attempting to show that the phenomena which may be elicited by so-called "Tidal Percussion" over the apices of the lungs are commonly and widely misrepresented and misunderstood.

Tidal percussion, as it is termed by Dr. Philip, has been practised for many years, and consists in percussion over the apices, or for that matter over other portions of the lungs, alternately during expiration (or easy respiration) and during full inspiration. So far as I am able to ascertain, Dr. Philip's views, on the results that may be obtained by this method of

examination, clearly and concisely reflect current teaching, which in effect is that the limits of supra-clavicular resonance increase with full inspiration and decrease with expiration. I have for some years been convinced that this teaching is absolutely erroneous, and I hope to be able to show that a careful and unbiassed consideration of the available evidence affords unmistakable proof of my contention.

In the year 1901 I published, with Dr. Eric Pritchard, a paper in *The Lancet* entitled "An Explanation of the Vulnerability of the Apices in Tuberculosis of the Lungs," in which we drew attention to the importance of investigating the tidal percussion-note in the supra-clavicular fossæ. Our observations, which must have escaped Dr. Philip's notice, forced us to the conclusion that the tidal percussion-phenomena, which may be elicited over the apices in early pulmonary tuberculosis, were the exact contrary of what is ordinarily accepted and taught; inasmuch as we found that the pitch of the percussion-note over the supra-clavicular fossæ rises, from below upwards, during full inspiration, and falls, from above downwards, during expiration. In other words, we observed a decrease in the limits of pulmonary resonance over the supra-clavicular fossæ during full inspiration, and an increase during expiration. More extended investigation, which I have carried on during the last eighteen months, has served to confirm these results, which, moreover, can be obtained, though in different degrees, both in healthy and in diseased conditions of the apices of the lungs.

I will as briefly as possible adduce the evidence on which these conclusions are based; and it can be conveniently formulated and discussed under two heads, viz.:—(1) Anatomical and physiological, and (2) Clinical evidence.

*Anatomical and Physiological Evidence.*—It will be observed that the apices of the lungs, unlike the rest of the pulmonary tissue, are not contained within the thorax, but project, dome-like, from three-quarters of an inch to one inch and a half above the border of the first rib. The coverings of the apices consist, therefore, not of the firm wall of the thorax, but of fascia, muscle, and skin, which under the most favourable conditions can offer, comparatively speaking, only an imperfect support to the lungs at the outlet of the thorax. Now, in order to obtain

a tidal increase of pulmonary resonance in the supra-clavicular fossæ, it is necessary to postulate an expansion or incursion of the apices of the lungs into the neck, during full inspiration. It will be my endeavour to show that the operation of the forces which act on the apices during inspiration, so far from producing this effect, absolutely negatives the possibility of any such cervical expansion or incursion of the lungs.

In the first place, it is inconceivable that the dome-shaped fascial coverings of the apices are capable of upward distension or enlargement, so that any increase in the capacity of these extra-thoracic pleural extensions is clearly out of the question. Furthermore, since the apices of the lungs, in their relation to the rest of the pulmonary tissue, are extra-thoracic, there are no demonstrable forces acting on these portions of the lungs during inspiration, which could possibly lead to their expansion or incursion into the neck. On these grounds, therefore, it appears safe to assume that no upward expansion or extension of the apices can take place during inspiration.

Again, it may be pointed out that owing to the fact that the spinal attachment of the first rib is higher than its sternal articulation, this bone lies obliquely in relation to the horizontal plane. The apex of the lung rises from three-quarters of an inch to an inch above the inner end of the clavicle, in accordance with the degree of obliquity of the first rib. In other words, the greater the obliquity of the first rib, the greater is the distance of the apex of the lung above the clavicle. During full inspiration the first rib and upper portion of the thorax, which carry with them the clavicle, are raised, so that the distance of the apex of the lung above the clavicles is necessarily lessened. Moreover, in consequence of the raising of the first rib, the attachments of the fascial covering of the apex are approximated, and its walls thereby rendered more or less slack ; and the effect of the atmospheric pressure on the diminished resistance offered by this structure must be to depress still further the apex of the lung. Furthermore, another effect of the raising of the first rib is to bring more of the extra-thoracic portion of the lung under the influence of the forces which expand the intra-thoracic pulmonary tissue ; and herein may be found a further cause for depression of the apices during full inspiration.

If the foregoing arguments carry the weight which I attach to them, it would appear, stated generally, that the statical and dynamical conditions which exist at the apices during inspiration, not only do not permit of the upward expansion or extension of these portions of the lungs, but operate rather in the reverse direction.

Under normal conditions inflation of the apices of the lungs during inspiration is effected by precisely the same causes which give rise to inflation of the rest of the pulmonary tissue. In other words, the extra-thoracic portions of the lung, during inspiration, and more especially during full inspiration, come actually or potentially under the influence of the negative pressure which determines the entrance of air into the intra-thoracic portions of the lungs. I have attempted, I hope with some measure of success, to show that this process entails a reduction in the height of the apices above the clavicles.

In tubercular disease of the lungs, and in other abnormal conditions, the dynamical forces which operate at the apex become modified. Thus, owing to the relative immobility of the upper portion of the chest, the extra-thoracic portions of the lungs do not come so markedly under the influence of the forces which lead to inflation of the intra-thoracic pulmonary tissue. The apical portions of the lungs, therefore, tend to collapse during inspiration, under the influence of atmospheric pressure, and of the weakening or absence of the forces which promote inflation.

On these grounds, therefore, it appears that an increase of tidal resonance in the supra-clavicular fossæ during full inspiration is an impossibility. On the other hand, theoretical considerations point to a gradual decrease in the resonance from below upwards, and in point of fact this deduction is borne out, so far as my experience goes, by clinical observations.

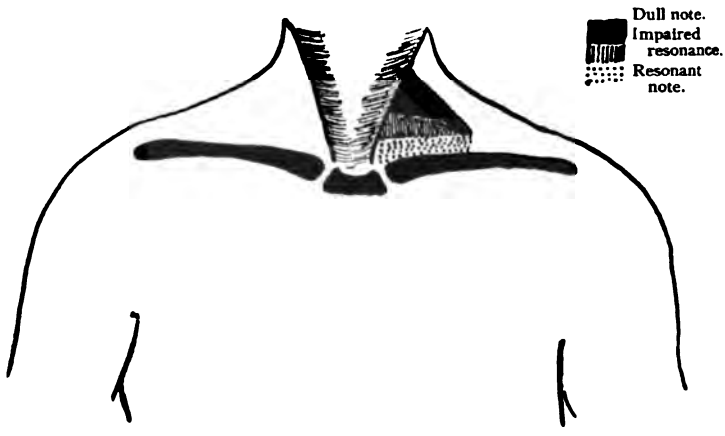
*Clinical Evidence.*—Inspection of the supra-clavicular fossæ, in conditions both of health and of disease, more especially in thin subjects, not uncommonly reveals sucking in, and descent of these spaces during a full inspiration.

In tubercular and other diseased conditions of the apices —and for that matter not infrequently under conditions of apparent health—this phenomenon is so remarkably obtrusive

that the wonder is how any clinician can reconcile such ocular demonstration with diametrically-opposed information (*sic*) obtained by the method of percussion.

In the healthy subject supra-clavicular resonance can usually be obtained, as Dr. Philip very justly points out, for about three finger-breadths (roughly one and a half to two inches) above the clavicles. If now a full inspiration be taken, the note over the second finger becomes increasingly higher-pitched, while over the third finger a dull note is obtained. If at the end of a full inspiration the glottis is closed and the thorax "let go," the note over the second finger becomes slightly lower in pitch (*i.e.*, more resonant), showing that air has been driven into the apices. In order that these signs may be most clearly elicited, percussion should be lightly made from the wrist only, while care must be taken to exclude the clavicular note. A diagrammatic representation of the signs that may be elicited by means of percussion in the supra-clavicular fossæ during full inspiration is shown in the accompanying figure.

Fig. 1.




*A Diagrammatic Representation of the Percussion-Signs which may be elicited in the supra-clavicular Fossæ during full Inspiration.*

In cases of early pulmonary tuberculosis the signs just described are emphasised and exaggerated. Thus, the note over the first finger is frequently raised in pitch, while over

the second and third fingers it is absolutely dull. In extreme instances there is absolute dulness over all three fingers during inspiration, with resonance sometimes more or less impaired, over the first finger, and possible the second during expiration.

Fig. 2.

*A Diagrammatic Representation of the Percussion-Signs in early Pulmonary Tuberculosis.*

When I compare these observations with those made by Dr. Philip, I am utterly at a loss to explain the discrepancy in the results which we have obtained. I am, however, convinced that the dynamical conditions which operate at the apices of the lungs do not admit of the expansion or extension into the neck of these portions of the lungs during inspiration. On this account I am emboldened to publish the results of my clinical observations, inasmuch as they coincide with the conditions which I should expect on theoretical grounds. In any event I trust the observations which I have made and reported in this paper will serve to ventilate the importance of tidal percussion, so that the question at issue between Dr. Philip and myself may receive a satisfactory solution.

# DISEASES OF THE LIVER.

## A REVIEW OF SOME RECENT WORK.

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### FAMILY CHOLÆMIA.

*Simple family cholœmia,* which is a diathesis rather than a disease, is undoubtedly a far-reaching conception as set forth by Gilbert and Lereboullet (*Gazette Hebdomin. de Médecine et de Chirurg.*, September 21, 1902, p. 889, and in *Medical Review*, November 1902, p. 652). It is commoner in Eastern races and Jews than in Western nations, and in private than in hospital practice. It is compatible with apparent health, or may give rise to a series of important secondary symptoms, such as dyspepsia, abdominal pain, hæmatemesis, mucous enteritis, melancholia, megrim, albuminuria, rheumatic pains, epistaxis, and slow pulse. It is closely related to transient or chronic jaundice, jaundice with splenic enlargement, biliary cirrhosis, and similar diseases. In the number of conditions to which it can give rise it reminds one of Murchison's catholic ideas as to lithæmia or functional disease of the liver. The primary signs of this suggested condition are chiefly pigmentation of the skin, which may be of the nature of slight jaundice, or dark and even like that of Addison's disease, moles, freckles, and brown areas ("biliary mask") resembling the melasma of pregnancy. Xanthelasma of the eyelids is occasionally met with. Xanthodermia, melanodermia, and xanthelasma of the eyelids form the three pathognomonic signs. The urine is usually free from bile-pigment, but in a majority of the cases contains urobilin. The blood-serum almost always contains bile-pigment.

By "*hæmophœic*" or "*urobilin*" *jaundice* a condition was formerly described in which the skin, though stained in a manner indistinguishable from that produced by bile, was thought to derive its colour from impregnation with pigments

other than those of bile. Gubler believed the skin was pigmented by a body, hæmophein, derived from hæmoglobin; while German writers believed that the colour of the skin depended on urobilin. The basis for this view was the constant, or almost constant, presence of urobilin in the urine, and the absence of bile-pigment. Hayem's conception of hæmophœic jaundice was that it was due to a combination of true and modified bile-pigments. Gilbert and Herscher (*La Presse Médicale*, December 27, 1902, p. 1239) find that the blood-serum in so-called hæmophœic jaundice contains a certain amount of true bile-pigment, but no urobilin; the term "urobilin jaundice" is therefore erroneous. The urine is highly coloured, contains urobilin in considerable quantities, and usually bile-salts; only exceptionally bile-pigment. The urine absorbs the right end of the spectrum. A better name for the condition, since bile-pigment is usually absent from the urine, is *acholuric jaundice*. Gilbert and Herscher regard this condition as a mild form of jaundice affecting the skin of the face, palms of the hands, soles of the feet, and conjunctivæ, in which the urine is concentrated and rich in urobilin. The only difference between this condition and the "simple family cholæmia," described by Gilbert and Lereboullet, is the concentration of the urine. The urobilinuria is regarded as evidence of the presence of bile-pigment in small amount in the blood-serum, the kidneys being regarded as responsible for the transformation of bile-pigment into urobilin. If larger quantities of bile-pigment are present in the blood, the kidneys are unable to effect a complete transformation, and bile-pigment appears in the urine; or in other words, choluric jaundice is associated with urobilinuria.

At the *Clinical Society* on January 23, 1903, Weber showed a girl, æt. 18½ years, of Polish-Jewish descent, with *persistent slight jaundice of four years' duration*, without obvious enlargement of the liver or spleen, and without marked impairment of health. The fæces contained bile; the urine was not concentrated and occasionally showed a urobilin-band, and a slight reaction for bile-salts. The blood-serum contained bile-pigment. The case resembled simple family cholæmia, but it was not congenital, and no other member of the family was affected. Weber regarded it as due to obliteration of some of the smaller

intrahepatic ducts. In the discussion which followed Sir Dyce Duckworth thought it was probably syphilitic. Sir T. Barlow and Dr. H. Batty Shaw read a paper (*Trans. Clinic. Soc.*, Vol. XXXV., p. 155) on two cases, mother and son, showing *inheritance of recurrent attacks of jaundice and of abdominal crises with hepato-splenomegaly.* These cases resembled a series of cases of six individuals in three generations of the same family, described by Dr. Claude Wilson as allied to, if not examples of, splenic anæmia, and they appear to be closely related to a group of cases of which Lereboullet (*Thèse de Paris*, 1902, No. 150) has collected fifteen under the name of "chronic splenomegalic jaundice." The question was considered as to the relationship of these cases to Hanot's Biliary Cirrhosis, but in the absence of any pathological evidence, and in the light of the fact that in one of Wilson's cases the liver was found to be free from fibrosis, the authors considered it best to limit themselves to the descriptive title without committing themselves further as to the underlying changes.

J. A. Arkwright (*Edinburgh Med. Journ.*, August, 1902) has published a family series of *fatal and dangerous cases of icterus neonatorum*—fourteen cases in one family with four survivors. There were fifteen children; about one there was some uncertainty, but all the rest had jaundice, which was not congenital but came on in the first few days of life and lasted a few weeks to several months. Males and females were both affected. The motions were usually dark-yellow or green, and never unduly pale. Hæmorrhage only occurred in one case, from the navel. No post-mortem examinations appear to have been available, but the author believes that the symptoms were due to hepatitis and a descending angiocholitis, which probably did not obstruct the common bile-duct. It is noteworthy that the mother had jaundice when she was four years old.

*The regenerative changes in the liver after acute yellow atrophy* is a subject of great interest both pathologically and clinically, as it has a most important bearing on recovery from this very fatal disease. W. G. MacCallum (*Johns Hopkins Hospital Reports*, Vol. X., p. 375, 1902) describes the pathological changes in a case of acute yellow atrophy in a boy aged 13 years who was ill with the symptoms of that disease for fourteen days; six months previously he had been ill for three

months. The liver weighed a little more than 19 ozs., and, in addition to acute red atrophy, showed a large projecting mass, green in colour, on the right lobe and a number of similar but smaller nodules in the Spigelian and left lobes. They looked like new growths, but were nodules of compensatory hyperplasia of the liver-cells. Microscopically regeneration of the liver-cells after acute atrophy may be brought about in two ways. When the liver-cells are completely destroyed the interlobular bile-ducts proliferate and form cellular processes or "bulbous sprouts," with a central bile-channel, which pass into the degenerated lobule and eventually become so modified as to resemble liver-cells. The terminal cell of each of these processes shows mitotic figures. Marchand considered that the club-shaped cell-masses were formed by the apposition of degenerating liver-cells, but Strœbe and MacCallum are both opposed to this view. The liver-cells, in cases where they are not completely destroyed, especially those around the inter-lobular vein, proliferate and form adenomatous masses; the cells become enlarged and may contain many nuclei. The result is that a distorted, though sometimes recognisable, picture of the lobules of the liver is produced.

BILIARY CIRRHOSIS WITH AND WITHOUT CHOLELITHIASIS.

This subject was discussed in an elaborate paper by F. Parkes Weber before the Pathological Society of London on December 2, 1902. He definitely recognised the existence of biliary cirrhosis from obstruction of the larger ducts by calculi, and quoted twelve cases of this nature, of which several had been under his care for long periods. In biliary cirrhosis without gall-stones and without obstruction of the larger ducts too much stress, he points out, should not be laid on the histological appearances, as the unilobular arrangement is not so diagrammatic as might be expected, though it is better seen in the early than in the late stages of the disease. The subject of biliary cirrhosis has been very minutely gone into by Lereboullet (*Thèse de Paris*, 1902, No. 180). Hypertrophic biliary, or Hanot's, cirrhosis has been treated surgically. Maurice Guillot (*Gaz. Hebdom. de Méd. et de Chirurg.*, 1902, January 16, p. 49) has collected thirteen cases of *Hypertrophic biliary cirrhosis treated by cholecystostomy* with recovery in

ten. Greenough (*American Journ. Med. Science*, Vol. CXXIV., p. 979) brings the number up to seventeen cases, of which thirteen were improved. Most of Guillot's cases were operated upon by Delagenière. The object is to drain the gall-bladder and bile-ducts, and so to get rid of the bacterial infection of the ducts. The fistula was kept open for varying periods, from ten days to three months; in some instances the bile, which at first was infected with microörganisms, subsequently became sterile. Although it is possible that some of Guillot's cases were not genuine examples of hypertrophic biliary cirrhosis, but some condition such as chronic catarrhal inflammation of the larger bile-ducts, it appears that the majority had the clinical characters described by Hanot.

### PORTAL CIRRHOSIS.

In addition to increased tension in the portal area and to the toxæmic condition of the blood, Bouchard (*Rev. de Méd.*, October, 1902, p. 837) insists on the factor of *an arterial change in the production of hæmorrhages in cirrhosis of the liver.* When cirrhosis is progressive there is a tendency to the production of multiple nævi on the skin; while, if the cirrhotic process is arrested and the patient's condition improves, these have been known to disappear. The nævi may bleed, and Bouchard has noticed that the hæmorrhage is arterial. He points out that nævi are frequently present on the mucous membrane of the pharynx in cirrhosis of the liver, and that hæmorrhage not uncommonly occurs from this source. Hæmatemesis may thus be induced.

The condition of the *pancreas in portal cirrhosis* has been investigated by Steinhaus (*Deutsche Archiv. f. klin. Med.* Bd. LXXIV., s. 537), who minutely examined the morbid anatomy of twelve cases of portal cirrhosis from this point of view. In all but one of the twelve cases the pancreas showed chronic interstitial pancreatitis, partly interlobular and partly interacinous, with considerable destruction of the gland-tissue, but the islands of Langerhans were not affected. The last observation, which is corroborated by Klippel and Lefas, is of considerable importance in connection with glycosuria and diabetes mellitus occurring in patients with cirrhosis of the liver. It appears that when glycosuria or

diabetes occur in this association, the pancreas and not the liver must be considered to be responsible. In an investigation of eight cases of ordinary cirrhosis, Klippel and Lefas (*Rev. de Méd.*, January, 1903, p. 23) found the pancreas fibrosed in varying degrees in all. There was no constant relationship between the size and consistency of the pancreas and these characters in the liver; the pancreas may, indeed, be in a more advanced stage of fibrosis than the liver, though this is unusual. They do not regard the changes in the pancreas, spleen, or intestines as secondary to the hepatic cirrhosis, but believe that they are concomitant results of a common cause, such as alcoholism. They regard the liver in cirrhosis as sharing in the morbid changes of a disease which in reality attacks, independently and at the same time, the gastro-intestinal glands, the spleen, pancreas, and liver.

### OPERATIVE TREATMENT OF CIRRHOSIS OF THE LIVER.

The operative treatment of cirrhosis of the liver has attracted a very considerable amount of attention within the last few years, and a number of papers have appeared dealing with the statistical results of this form of treatment. The operation of increasing the area of available anastomoses between the portal system and the general venous system, so that blood from the portal vein may escape without having to force a passage through the cirrhotic liver, was conceived by Talma, and is therefore often spoken of as "Talma's operation"; but, in justice to our own countrymen, it should be remembered that D. Drummond and Morison of Newcastle independently invented the operation, and must be regarded as having brought it into notice in England and America. The operation of producing artificial adhesions between the liver and the abdominal wall is not always carried out on quite the same lines, and it appears that it is a distinct advantage to utilise the great omentum as a means of multiplying the vascular adhesions. To show how extensively the operation has been performed in the last two years, it may be mentioned that, in a paper published in March, 1901 (*American Journal of the Medical Sciences*, Vol. CXXI., p. 251), Packard and Leconte collected 22 cases, while in the *Medical News* (N.Y.) of February 8, 1902, a tabulated list of 60 cases, in which the

operation had been done for the relief of ascites, was published by Brewer. Up to May 5, 1902, Greenough (*American Journal of the Medical Sciences*, Vol. CXXIV., p. 979, December 1902), brought together no less than 122 cases in which the operation had been performed for the relief of ascites, and after deducting 17 cases in which the pathological cause was other than portal cirrhosis of the liver, the imposing total of 105 cases is left. Of these 31 died within 30 days of the operation, while 29 were in no way improved, so that 60, or 57 per cent., were not benefited, while 44 were improved; of the latter, 9 were alive and in better general health two years after the operation. In connection with this last statement, I may mention that a case under the care of Mr. Turner and myself, operated upon July 31, 1899, and reported on in December of the same year, did not require any further tapping until January, 1902, but died early in the following May. Campbell Thomson (*Trans. Royal Medical and Chirurg. Soc.*, Vol. LXXXIV., p. 251), in a paper on the prognosis and treatment of cases of ascites in the course of alcoholic cirrhosis of the liver, drew, as Hale White had done some ten years before, a distinction between the cases in which ascites is directly dependent on the cirrhosis, and those cases of hepatic cirrhosis in which ascites is present but is due to some independent factor, such as chronic peritonitis; and he practically comes to the conclusion that the operation is only likely to do good in the cases where ascites does not depend on cirrhosis. The success in those cases, Thomson thinks, may possibly depend on obliteration of the peritoneal cavity by adhesions, thus rendering the recurrence of an effusion as impossible as it is in an obliterated pleural cavity.

## THROMBOSIS OF THE HEPATIC VEINS.

Thrombosis of the hepatic veins is a rare condition; Theodore Fisher (*Bristol Medico-Chirurgical Journal*, Vol. XX., p. 209, September 1902) gives a description of a case in a girl, aged 3 years, and refers to about seven published cases. In addition he has met with it in association with broncho-pneumonia and septic portal thrombosis. Usually, when cicatricial contraction of the hepatic veins and thrombosis

are found together, it is assumed that the stenosis is probably syphilitic in origin and primary; Fisher, however, suggests

*Sketch showing Distension of the Subcutaneous Abdominal Veins in Thrombosis of the Hepatic Veins. The shaded area indicates the liver as felt during life through the abdominal wall.*[1]

that the thrombosis may be primary, and be the cause of the contraction of the veins. The thrombosis may be due to toxines produced in the liver as the result of successful efforts in destroying microörganisms. Clinically, there is always ascites coming on from six weeks to four months before death. There may be marked dilatation of the subcutaneous abdominal veins. In three cases there was gastro-intestinal hæmorrhage.

A case of *primary and obliterative inflammation of the hepatic veins* is described by Craven Moore (*Medical Chronicle*, July, 1902) in a woman, aged 25, in whom the existence of syphilis was possible though not proved. There was ascites and considerable dyspnœa. The liver was "nutmeggy," weighing 42 ozs., and the spleen weighed 4½ ozs. The

[1] For this Fig. we are indebted to Dr. T. Fisher.

trunks of the hepatic veins were dilated and contained dark clot, and their openings into the inferior vena cava were represented by small dimples. Moore has collected records of 12 such cases and finds that the disease is equally distributed between the two sexes, and that the average age is 29 years. Ascites is almost constant. The duration of life after the onset of symptoms is on an average five or six weeks. Hæmatemesis is rare. Syphilis has been suggested as a cause, especially by Chiari, who described three cases, but on rather slender evidence. The entrance of the ductus venosus into the inferior vena cava close to the hepatic veins might suggest that stricture of the veins was due to a congenital factor; but this is not regarded as probable, since the ductus venosus is not found to be pervious. It is suggested that there is a congenital factor which enables some hæmatogenous poison to set up a limited inflammation at this point of diminished resistance.

### ADENOMA OF THE LIVER.

Adenoma of the liver is of two distinct forms—(*a*) the single or solitary adenoma, and (*b*) the multiple adenomata, which are nearly always associated with cirrhosis. A very complete study of a case of *solitary adenoma* has recently been made by Pepere (*Archiv. per le Scienze Mediche*, Vol. XXVI., page 117, 1902), who argues in favour of their congenital origin. In the centre of the right lobe of the liver of a man, aged 21 years, who died from malaria and cardiac failure, there was an encapsuled tumour, with a diameter of 7 c.m., which stood out in marked contrast, by reason of its bright greyish-pink colour, to the brown liver-tissue. The tumour was composed of liver-cells divided up by fibrous tissue into a number of compartments. The rest of the liver showed very early multilobular cirrhosis. Both the liver and the tumour showed infiltration with black (blood-) pigment. A very remarkable point about the case was the presence of innumerable small nodules of liver-cells, or *accessory livers*, scattered over the peritoneum and great omentum.

*Multiple adenomata in association with cirrhosis* have given rise to a great deal of discussion, especially as regards

their relation to the fibrosis. They might be considered to produce the cirrhosis by irritation, just in the same way that secondary new-growths give rise to local fibrosis in their neighbourhood; or to be produced at the same time as the fibrosis as the result of a poison irritating the liver-cells and the connective tissues simultaneously; or lastly—and this seems an attractive view—the adenomata or nodular hyperplasia might be an attempt at compensation for the destruction of liver-cells, and therefore a secondary result of cirrhosis. Pepere, however, it is interesting to note, is definitely of opinion that cirrhosis does not precede the development of multiple adenomata.

### PRIMARY MALIGNANT DISEASE OF THE LIVER.

The interesting subject of *primary malignant tumours* of the liver has been made the subject of an exhaustive pathological research and critical survey by Pepere of Pisa (*I Tumori maligni primarii del Fegato*, Naples, 1902). In a list of 44 cases of primary sarcoma of the liver the importance of the part played by the blood-vessels, as the starting-point for the tumour-growth, is shown by the fact that in *22* of these cases the walls of the blood-vessels were regarded as responsible for the growth. In eleven of them the endothelium was definitely incriminated, so that endothelioma is probably a comparatively frequent form of primary hepatic sarcoma. In several other instances the growth was derived from the perivascular sheath, and was, therefore, a variety of angio-sarcoma, viz., a perithelioma. Anatomically, it is commoner to get a diffuse nodular growth, in primary sarcoma, than a single large growth. Turning to the clinical aspect, Pepere has attempted to differentiate between primary sarcoma and primary carcinoma. He believes that the tumour is larger in sarcoma, that the course of the disease is even more rapid, and that ascites and jaundice are less frequent than in carcinoma.

Acland and Dudgeon (*Lancet*, 1902, November 15) met with a remarkable instance of *primary carcinoma of the liver in a boy aged* 15 *years*. The tumour grew with such vigour that, although the patient became considerably emaciated, he actually gained 19¾ lbs. while in the hospital. The liver weighed

15 lbs. 14½ ozs., or two-fifteenths of the total weight of the patient. The early age of the patient is remarkable, since the records of the last sixty years only contain eight cases of primary carcinoma of the liver under the age of 20, and of these several are open to considerable doubt. The present case was a spheroidal-celled carcinoma arising from the hepatic cells. Another point of interest about the case was the presence of fever, suggesting that there was a subdiaphragmatic abscess pushing the liver downwards, or a hepatic abscess. On admission the boy's temperature was 103° F., and there was a considerable evening rise with a morning fall until just before the fatal termination. The fever was probably correlated to the rapidity of growth, as there was no inflammatory complication found at the autopsy.

A case of *multiple primary adeno-carcinoma with cirrhosis* of the liver is dealt with from a pathological point of view by Catherine H. Travis (*Johns Hopkins Hospital Bulletin*, No. 134, p. 108, May, 1902,) in a copiously-illustrated article. The tumour showed variations in its structure, but transitions from the cells of the tumour to those of the liver could be made out. It was thought that the tumour might have resulted from the progressive atypical growth of the hyperplastic masses, produced coïncidentally with the cirrhosis by a process of repair and regeneration, after extensive destruction of the liver by some unknown poisonous agent. The new growth invaded both the portal and hepatic veins, and was found in branches of the pulmonary arteries, giving rise to secondary growths in the lungs. Some of the cells of the tumour were very large, and either contained a single immense nucleus or many large nuclei.

Pepere (*Archives de Médecine expérimentale et d'anatomie pathologique*, Tome XIV., page 765, Nov., 1902) has given a full and interesting account of a *primary malignant tumour of the liver arising from an included accessory suprarenal body.* This origin of a primary tumour in the liver is analogous to the well-known renal tumours arising in suprarenal "rests" embedded in the kidney. Schmorl, in 1891, showed that accessory suprarenal bodies might be found in the liver, and Oberndorfer (1900) has confirmed this observation; both these authors considered that the liver-tissue showed signs of

attempting to eliminate the inclusion. Incidentally Pepere points out that hepatic tumours may possibly be due to hyperplasia of pieces of other organs, such as the duodenum or pancreas, which have been displaced and included in the substance of the liver.

The patient was a woman, aged 40, who had pleurisy and hæmorrhagic ascites. Examination of the liver showed that the left lobe was entirely replaced by a primary growth which was firm, and white in colour with yellowish-red areas in it. The right lobe contained secondary growths, and some of the tumour projected into the portal vein. The hæmorrhagic character of the ascites was due to rupture of a nodule of growth. There were secondary growths in the lungs, diaphragm, and inguinal lymphatic glands. From naked-eye examination it was thought to be a primary sarcoma. Microscopically the growth was composed of winding strands of well-formed, palisade-like cells. These cells were in relation with two sets of capillary blood-vessels, one of which probably nourished the cells, while the other possibly carried off metabolic products. The latter capillaries contained hyaline or granular masses, which were compared with the material normally present in the veins of the adrenal glands. The tumour was regarded as arising from cells belonging to the medulla of the suprarenal body. Around the tumour there was marked fibrosis of the liver, but there was no general cirrhosis. This attempt on the part of the liver to limit the growth makes the development of a primary tumour from suprarenal remnants comparable to that of secondary growths. The author discusses very fully the nature of the tumour, and, after rejecting sarcoma and endothelioma, is inclined to regard it as a carcinoma. While admitting its resemblance to an "adenomatous endothelioma," he points out that careful search failed to show any proliferation of vascular endothelium."

### TUBERCULOSIS OF THE LIVER AND PANCREAS.

A comparative study of the morbid changes induced by tuberculosis in the liver and pancreas has been made by Gilbert and Weil (*Archives de Médecine expérimentale et d'anatomie pathologique*, Tome XIV., page 729, November, 1902), based on the examination of 25 cases, of which 10

were chronic pulmonary tuberculosis, 7 sub-acute and 3 acute pulmonary tuberculosis, 2 generalised tuberculosis, and 3 pleural and peritoneal tuberculosis. The liver is practically always altered, either showing degenerative changes, such as fatty metamorphosis, or definite evidences of tubercular infection. But although histologically the tubercles may be distinctly seen, the actual presence of bacilli could only be proved in two instances. Chronic venous engorgement is very common, and is due to a terminal failure of the right side of the heart. The naked-eye appearance of the pancreas in these cases reveals little, but microscopical changes are not uncommon. In 13 out of the 25 cases there was some form of fibrosis. In two cases of advanced fibrosis there was invasion of the organ by fat from without, fatty peri-pancreatitis analogous to the change seen in granular kidney (perinephritis lipomatosa), and hypertrophy or hyperplasia of the islands of Langerhans. Degeneration of the cells lining the acini were also seen in some cases, but tubercles were only found in two cases, both of peritoneal tuberculosis. Thus, in making comparison of the two organs, it is seen that, though both are commonly affected, the changes are different. The liver frequently shows tubercular infection, the pancreas rarely: this depends on the fact that the portal vein carries infection from the intestines to the liver, but not to the pancreas. Further, the pancreas, like the submaxillary and parotid glands, is not a favourable soil for the growth of tubercle-bacilli. While true cirrhosis of the liver is regarded as rare, this change is common in the pancreas, in chronic pulmonary tuberculosis.

A case of *tuberculosis of the liver and spleen* in a man, aged 66, is reported by Tolot (*Lyon Médical*, Tome XCIX., p. 323). The case is interesting inasmuch as there was no primary tuberculous focus found in the lungs or alimentary tract, though the bronchial glands were affected. The liver and spleen contained numerous encysted tubercular masses which closely resembled gummata.

### EFFUSION OF BILE INTO THE PERITONEUM.

Dévé (*Rev. de Chirurgie*, July 10, 1902, p. 67) has made a special study of effusion of bile into the peritoneum, as the

result of rupture of a hydatid cyst, which is in communication with a bile-duct. This condition of *Choleperitoneum of hydatid origin* or *Hydato-choleperitoneum* must of course be distinguished from bilious ascites, since ascites in a person with jaundice always contains bile-pigment. Effusion of bile so long as it is aseptic does not set up peritonitis, as was shown in 1891 by Dupré and Mauny. Dévé has collected 15 cases, in no less than seven of which rupture of the cyst into the peritoneum took place spontaneously and without any sufficient cause. It was thought by Davaine and others that the entrance of bile into a hydatid cyst favoured rupture of the cyst; Dévé, however, concludes that, as a general rule, the communication between the cyst and the bile-ducts occurs after, and in consequence of, the rupture of the cyst into the peritoneum, and is comparable to the entrance of bile into a cyst after tapping. In choleperitoneum there is no fever, and curiously enough, in spite of the great capacity for absorption possessed by the peritoneum, no jaundice. The abdomen, usually slowly but sometimes comparatively quickly, swells and eventually requires tapping; it is not till then that the diagnosis is usually made. The fluid has a great tendency to reäccumulate and to require repeated tapping; the average amount withdrawn is from 8 to 10 litres. Spontaneous cure may take place. It is a curious fact that the presence of bile in the peritoneal cavity does not, as might naturally have been expected, prevent secondary infection of the peritoneum with hydatids.

### PSEUDO-TUBERCULOSIS OF HYDATID ORIGIN.

An interesting result of rupture of a hydatid cyst into the abdominal cavity is *peritoneal pseudo-tuberculosis of hydatid origin.* The peritoneum shows a number of small nodules the size of a millet-seed or pin's head which, both to the naked eye and microscopically, resemble miliary tubercles. They contain hooklets or fragments of hydatid membrane which the tissues are attempting to absorb. Dévé (*Soc. de Biolog.*, January 17, 1903) believes that the general opinion that bile has a parasiticidal action on hydatids is not accurate, for secondary cysts may develop in the peritoneum in cases of bilious peritoneal effusions, and he has found that scolices will continue to grow in hydatid fluid containing bile in the various

proportions of one-fifth, one-third, and even one-half. Five minutes' exposure to the action of 1 in 1,000 perchloride of mercury or 1 in 100 formal will completely kill the scolices of echinococci.

### PERIHEPATITIS.

A. G. Nicholls (*Studies from the Royal Victoria Hospital, Montreal*, Vol. I., No. 3, April, 1902), in a monograph of eighty pages on "Multiple Progressive Hyaloserositis," studies in detail the relationship of such local conditions as chronic perihepatitis and perisplenitis to inflammation of the serous membranes in general. Though the chronic hyperplastic overgrowth of connective tissue, together with hyaline metamorphosis, may be almost confined to the capsule of the liver, it is usually part of a generalised lesion affecting in turn one serous membrane after another. Originally described by Budd in 1852, chronic perihepatitis was specially studied by Curschmann, who invented the term Zuckergussleber, or "Iced liver," to describe the membrane on the surface. Nicholls records a case of this simple chronic peritonitis affecting the liver-capsule, and others in which the condition of the liver-capsule was not "Zuckerguss": in addition he tabulates 13 cases of "Zuckergussleber," in which only two out of Hale White's 22 cases of chronic perihepatitis are included. In these 14 cases the earliest age at which the process began was four years, and the latest 55½ years, 8 being over 40 years of age. The incidence on the two sexes was equal. In 11 out of the 14 there had been an acute inflammatory attack, such as hepatitis, pericarditis, &c. The onset was acute in six. There are two clinical types of chronic hyaline perihepatitis:—(1) Primary perihepatitis, in which ascites is the leading feature. After a time the disease spreads to the right pleura and pericardium; the liver and spleen are usually enlarged. (2) Primary pericarditis, in which the earliest symptoms are those of adherent pericardium or indurative mediastino-pericarditis. The process spreads to the right pleura, and eventually to the capsule of the liver. In both forms jaundice and gastro-intestinal hæmorrhage are absent; the urine is diminished, and rarely contains albumen. The cases last from two to sixteen years, and usually die from some acute infection, such as pneumonia.

After death the body is emaciated, though this is usually somewhat masked by anasarca; the superficial abdominal veins are dilated; ascites is extreme, the fluid being straw-coloured and rich in albumen (3 per cent.), so as to suggest an inflammatory exudation rather than a passive transudation. The omentum is rolled up into a fibrous card, and may contain hydropic cysts. The "Zuckerguss" membrane rarely covers the whole of the liver, and is more marked on the convexity; it is composed of successive layers of fibrous tissue which are swollen from hyaline degeneration. In the deeper layers, and between it and the underlying capsule, which is thrown into folds, there are collections of leucocytes and mast-cells. No fibrin-reaction is obtained. There is very rarely any cirrhosis of the liver. The question whether the change is due to passive engorgement or to inflammation is discussed at length; and the conclusion is reached that the condition is definitely inflammatory, and probably due to infection with microörganisms of a somewhat low grade of virulence, but capable of sclerogenous effect. The microörganisms likely to produce this effect are the B. tuberculosis, typhosus, and coli. The parts especially affected by this chronic hyaline peritonitis, viz., the upper surfaces of the liver and spleen and the bases of the lungs, are in a constant state of unrest; and thus, when they are once inflamed, irritation is kept up. The progressive lesion may commence in the peritoneum, pericardium, or pleura, the first being the commonest seat of origin. Nicholls does not consider that granular kidney plays an important part in the production of chronic hyaline peritonitis.

Kelly (*American Journal of the Medical Sciences*, Vol. CXXV., p. 115, January 1903) has also contributed an elaborate essay on "Multiple Serositis," or "The association of chronic obliterative pericarditis with ascites, with particular reference to the 'pericarditic pseudo-cirrhosis of the liver' (of Pick) and the 'iced liver' (Zuckergussleber of Curschmann)." He collected 39 cases of Polyserositis, or, as it has been called in Italy, Concato's disease or Polyorrhomenitis. In 38 of these the pericardium was obliterated by chronic adhesions, and in 10 it was calcified. In 25 cases the left pleura showed more or less extensive chronic adhesions (10 cases), or was entirely obliterated and generally thickened (15 cases). In 29 cases

the right pleura showed more or less extensive adhesions (12 cases), or was entirely obliterated and generally thickened. In 28 cases there was chronic perihepatitis, and in 31 cases either chronic perihepatitis or chronic peritonitis, or both; in 28 cases there were more or less extensive chronic adhesions of the peritoneum. The cases all had ascites and more than one serous membrane affected. The inflammatory change may begin either in the pericardium, pleura, or peritoneum, and it then spreads to one or more of the others. The tendency of modern writers is to consider the change to be tubercular, even in the absence of clear evidence of tuberculosis; but it must be conceded that some cases are not of this nature. Contrary to Pick's view, Kelly believes that as a rule the liver has not much to do with the production of ascites in these cases, since in 31 of his cases there was chronic peritonitis or chronic perihepatitis. Cases of adherent pericardium with recurrent ascites, an enlarged, firm and somewhat irregular liver, absence of marked jaundice and œdema of the legs, were called by Pick, pericarditic pseudo-cirrhosis of the liver, since clinically the cases resembled cirrhosis. He considered the ascites as secondary to connective-tissue hyperplasia in the liver, and regarded associated peritoneal alterations as more or less accidental, and due to long continued engorgement and ascites. Kelly groups together, under the heading of Multiple Serositis, Pick's cases and the cases of "iced liver," or, as they are usually called in England, Chronic Universal Perihepatitis. To quote his own words, "Some distinction—anatomically at least—may be drawn between cases in which the lesions are confined to the peritoneum and cases in which the lesions are more widespread. The cases in which the pericardium is unaffected reveal no congestive alterations in the liver. Clinically, however, the two classes of cases are very much alike, and the 'Zuckergussleber' may occur in both."

# CEREBRAL AND MENTAL DISEASES IN RELATION TO GENERAL MEDICINE.

## A Review of Recent Work.

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### THE STUDY OF INCIPIENT CASES OF INSANITY.

The importance of studying the early stages of mental diseases as they first present themselves in hospital and private practice is becoming more and more recognised. The forced separation of the more severe cases and the necessity for special asylum treatment of many patients, even in comparatively early stages, appear to have been the means of separating the subject almost entirely from the domain of general medicine, with the unfortunate result that early stages of insanity have not received the amount of attention which they deserve.

The importance of this subject was brought before the annual meeting of the Medico-Psychological Association, 1902, by Dr. T. S. Clouston,[1] who opened a discussion on "The possibility of providing suitable means of treatment for incipient and transient mental diseases in our great general hospitals." In the interesting discussion which followed Dr. Clouston's remarks, there were differences of opinion as to the suitability of hospital wards for incipient cases of insanity, and many speakers were inclined to favour the country rather than the town for such cases. The discussion, however, clearly showed that there is a need for more attention to be given in the out-patient departments of our hospitals and elsewhere to cases of early mental disease which often present themselves for treatment with or without accompanying bodily diseases.

Sir John Sibbald[2] has recently contributed an article on "Psychiatry in General Hospitals," in which he considers the

[1] *Journal of Mental Science*, October, 1902.
[2] *Journal of Neurology and Psychiatry*, January, 1903.

circumstances which have hitherto kept the study of this subject apart from that of neurology; and he forcibly points out the reasons which exist for studying the two together. He also makes out a strong case for the treatment of incipient cases of mental disease which are still uncertifiable in general hospitals both in the interests of the patient and in the interests of medical education. With regard to the former, a certain proportion of cases might be cured which would otherwise become incurably insane; and with regard to the latter, the students would have an opportunity of studying the diseases in their initial stages, with which they will be especially called upon to deal in their later professional life. These views of well-known authorities, which have just been quoted, show the importance of the subject, and they also show that, short of ideal methods of treatment which must develop slowly, there is a large field of work open to those attached to general and special hospitals.

## THE RELATIONS OF THE BRAIN TO THE VISCERA.

The close relations which exist between the higher parts of the central nervous system and the functions of the different viscera are also assuming greater clinical importance, and our knowledge of the influence of the mind on the body is gradually becoming more exact and more capable of practical application. In the last review[1] some of the relations between the brain and the stomach were alluded to. It was mentioned that excessive appetite had been shown to be sometimes associated with abscesses, tumours, and other gross cerebral lesions, and that an attempt had been made to localise the functions of the stomach in the brain. Recently, Pawlow's[2] interesting experimental work has thrown new light on the subject, for he conclusively shows by a series of most careful experiments that the primary and most necessary factor concerned in the secretion of gastric juice is a good appetite and a desire for food. The gastric secretion arising from this source Pawlow terms "psychic juice." In summing up the nervous mechanism of gastric secretion he says:—"In the immense majority of cases gastric digestion begins with a

[1] PRACTITIONER, March, 1902.

[2] *Work of the Digestive Glands.* Translated by W. H. Thompson, M.D.

strong central excitation of the secretory and trophic fibres of the glands. Sooner or later after the taking of food the influence of the reflex excitant comes into play, while the automatic psychic effect dies out." In order then that the process of digestion may proceed effectively, a good appetite and a healthy brain are as necessary as a healthy stomach; and the loss of appetite and enfeebled digestion, which is so often seen in neurasthenia and other varieties of nervous disorders, can now in many cases be physiologically explained. The explanation serves as a wholesome warning against taking too local a view of the functions of any one organ to the exclusion of the rest of the body.

### DIABETIC PSYCHOSES.

In the last review the relations which may exist between glycosuria and insanity were referred to, and papers by Dr. W. R. Dawson were quoted, to show that cases of insanity associated with glycosuria may be divided into two groups, viz.:—(i.) Cases in which morbid mental phenomena have arisen in the course of glycosuria, which presumably gave rise to them; and (ii.) cases in which glycosuria developed as a symptom during an attack of mental disease. It was further stated that, while it is not unusual to meet with some mental depression and irritability of temper in persons suffering from diabetes, it is only in a few instances that these symptoms amount to actual insanity. Dr. Dawson has recently made a further contribution to the subject in a "Note on the Pathogenesis of Diabetic Insanity."[1] He shows that the peculiar form of weak lethargic melancholia with impaired intelligence and peevish irritability, which may be accepted as the characteristic psychosis of diabetes, is yet by no means peculiar to this affection, the same state of mind being met with in anæmias, general cachexy, and in other conditions in which there is imperfect aëration of the blood. It may therefore, he thinks, be considered that the special psychosis is one depending upon a deficient supply of nutritive material—particularly oxygen—to the brain, this deficiency of oxygen being one to which the cortical nerve-

[1] *Journal of Mental Science*, October, 1902.

cells have been shown by experiments with carbon monoxide to be particularly sensitive. Dr. Dawson further considers that the anatomical changes in diabetic brains support the conclusion, derived from the symptoms, as to the atrophic origin of the psychosis, such changes consisting in wasting of the convolutions with consequent widening of the sulci, enlargement of perivascular spaces, and other changes which have been commonly observed. It is thus thought by Dr. Dawson that probably the cerebral lesions and the symptoms may be ascribed to the want of a proper supply of oxygen to the brain, and that in diabetes the failure of sufficient oxygen may be due principally to the appropriation of much of the oxygen by the glucose circulating in the blood. The evidence in support of this hypothesis lies in the fact that there is undoubtedly a substance with marked reducing powers present in diabetic blood as shown by the decolorisation of methylene blue, a reaction attributed by most observers to the glucose, which is the most powerful reducer of all the substances known to exist in such blood.

In experimenting, Dr. Dawson has found that a solution of glucose as weak as 2 per cent., rendered slightly alkaline with sodium bicarbonate and kept at about the body-temperature, will reduce hæmoglobin in time, though not for many hours, and he thinks that the same reaction may probably take place during life. He suggests the following sequence of events:—The blood from the right side of the heart, loaded with sugar from the hepatic and portal circulation, and 1° or 2° F. higher in temperature than that in the left side, encounters free oxygen in the pulmonary capillaries and levies toll of it first. During the course of the blood through the brain and circulation generally, the hæmoglobin is being robbed of a certain amount; when the energetic nascent oxygen is set free in the systemic capillaries for the use of the tissues, a further portion is absorbed, and possibly combination may take place even in the tissues. There can, therefore, be little doubt that a sensible diminution takes place in the amount of oxygen available for use by the tissue-cells, the vital capacity of which is lowered in consequence; and as the metabolism of the cortical cells is already very low, they feel this deprivation more than other organs.

A case has recently been recorded by M. Ed. Cornu [1] in which glycosuria was associated with melancholia and erotic symptoms. The author points out that this association is unusual, as in most cases of diabetes the sexual desire is diminished or lost. In the case in question there were no local troubles of the generative organs, and the symptoms diminished as the amount of the sugar in the urine decreased; and finally both conditions disappeared together.

### THE AFTER-EFFECTS OF INJURY UPON THE BRAIN.

Few things are more difficult to decide than the true relations between cause and apparent effect, and this difficulty is manifestly greater when the effect can only be inferred from symptoms occurring at some long interval after an injury. H. Stadelman [2] (of Berlin) has recently written on this subject, and considers that in order to bring cerebral changes into connection with the injury the following conditions must be fulfilled:—

(1.) The patient must have been healthy and sound before the receipt of the injury, and must not be of great age;

(2.) The injury must have been considerable;

(3.) The symptoms must have developed before our eyes.

According to some authors the diseased vessels must be opposite the injury.

Stadelman then relates cases as examples of the relationship between the injury and disease.

A healthy man, aged 47, was injured by a stone falling on his head; he was unconscious for about five minutes, but after that he scarcely thought of the accident, though he had been medically attended during several weeks for the scalp-wound and had kept his bed for a few days. After four or five weeks he became very depressed and attempted suicide twice. He was treated in different institutions, but without result. Two and a half years after the accident Stadelman examined him and found him stupid and complaining of giddiness and headache. There was great loss of mental power; he could not say which month or week it was, and could not do the simplest

[1] *Annales Medico-Psychologiques*, May and June, 1902.

[2] *Medical Press and Circular*, December 17, 1902.

arithmetical problems. There was a tender scar at the site of injury between the frontal and temporal lobes, but it was not fixed to the underlying bone. Stadelman points out that in this case serious cerebral changes took place in consequence of the accident, although the first symptoms did not present themselves until four weeks after the receipt of the injury.

In another instance a man, aged 29, was brought into the hospital in an unconscious condition, with a history of having received a blow on the head four weeks before. The blow had caused him to fall unconscious; but he had quickly recovered himself, and in spite of a wound of the head he had been able to go to work, and had appeared well and in good spirits. Suddenly in the night he was attacked with convulsions, and, losing consciousness, was brought to the hospital. There was no paralysis to be found, but the mind was not clear. There was a scar fixed to the underlying bone in the region of the motor centre, and epileptic fits occurred, beginning in the left arm. The patient was operated upon, but died. An autopsy revealed an area of softening and hæmorrhage in the motor area of the right hemisphere. The explanation of the case was thought to be that a blow from behind, with the head bent, had caused the injury to the brain by *contre-coup*.

A paper on *Traumatic Encephalitis* has also been written by Dr. Henry P. Frost,[1] in which he records the case of a florid, full-blooded man, who was in the enjoyment of ordinary health when he received a blow upon the head of considerable severity. All his organs were apparently normal before the injury, though he had been subject for years to the strain of an exhausting and exciting occupation; his age was 56, there was no history of syphilis and no tendency to alcoholism.

The blow, which was caused by striking his head against a steel rod, rendered the patient unconscious for a few minutes, and caused a cut on the head above the right ear and about an inch from the median line. This was considered to be of little importance at the time, and he was able to continue his work though he had considerable headache. From this time on he was troubled with headache, which was referred to the injury. Twenty-eight days later he had a convulsion during

[1] *American Journal of Insanity*, January, 1902.

the night; and after an interval of two months convulsions became frequent, and mental changes occurred. Death took place a year afterwards from cerebral apoplexy. A post-mortem examination showed symmetrical areas of softening at the base of the brain, exactly in the position where a blow on the vertex would act by *contre-coup*. There were also evidences of commencing arteriosclerosis in the brain and kidneys, and a gross cerebral hæmorrhage in the hemisphere corresponding to the injury, in which the effect of *contre-coup* was most pronounced; in which also the vessels were most involved in inflammatory exudation. The hæmorrhage, which had taken place in the right hemisphere, was 2·5 cm. in length, 1 to 1·5 cm. in breadth, and ·5 cm. in depth; it was situated in the external capsule, invading the lenticular nucleus externally, and breaking through the claustrum, but not communicating with the ventricle.

The conclusions at which Dr. Frost arrives are that the patient's convulsions and mental symptoms were directly due to the lesions at the base of the brain; that the slight disease of the blood-vessels may have caused the brain to be more vulnerable than usual; and that the congestion and the stress of the inflammatory process along with the convulsions hastened and intensified the pathological change in the vessel-walls, and in that way led to death from cerebral hæmorrhage.

Cases such as the one above described are naturally of great medico-legal importance, and therefore deserve close scrutiny, before the exact relations of the injury to the cause of death can be decided It will be noted that there was arteriosclerosis of the kidneys, which appeared to be of about the same degree as that observed in the brain. This is evidence in favour of a generalised degeneration, and, as the author states, no doubt made the brain more vulnerable. The thoracic organs are noted as normal, but one would have liked to have been definitely informed as to the weight of the heart, and whether the left ventricle showed any hypertrophy.

The author quotes the opinions of various neurologists and pathologists concerning the varieties of encephalitis, and arrives at the conclusion that the occurrence of localised

inflammation of the brain-substance from traumatism, such as a blow upon the head, has only been recently recognised, although surgeons have long been familiar with cerebral contusions of all degrees. If the patient dies soon after the injury, such a lesion is noted under the head of contusion or laceration; while if he recovers and dies after the lapse of years, the healed lesion is apt to be overlooked, and any mental symptoms from which he may have suffered are attributed vaguely to shock, cerebral commotion, or constitutional predisposition.

Some interesting experimental observations which may have some bearing upon the after-effects of injury to the brain are recorded by Friedmann.[1] He found that, after cauterisation of a small portion of the brain of a sparrow and of a rabbit, the animals although well in general health became altered in character. The sparrow was aggressive and disturbed other birds, and attempted to attack anyone who approached it. In both cases diffuse changes resembling a lymphoid infiltration were found throughout the brain, and these were considered to be secondary to the lesion. As other animals on which the same experiments were performed remained normal, it has been suggested that the results tend to show that the changes in character which sometimes occur in human beings after injury may possibly be due to some secondary change of this nature. Further investigation of the question would be interesting.

## LOCALISATION OF MENTAL FACULTIES.

Localisation of the mental faculties in the brain is a subject which is always interesting, and an important addition to it has recently been made by Charles Phelps[2] who brings forward strong clinical and pathological evidence to show that the chief seat of the mental faculties is in the left prefrontal lobe, and that loss of mental power appears to be proportionate to the extent of the lesion rather than to its exact situation. Dr. Phelps draws his conclusions from the personal observation and record of 800 cases of intracranial traumatism of which more than 300 were subjected to either

[1] *Neurologisches Centralblatt*, May 1, 1902.
[2] *American Journal of Mental Science*, April, 1902.

operative or post-mortem inspection. After cases from which no reliable evidence could be drawn for the present enquiry have been excluded, on account of death having been preceded by primary and permanent unconsciousness, the remainder have been used to show the presence of lesions in the left frontal lobe where mental symptoms were noted, or the absence of such symptoms when the lesion was situated in some other part of the brain.

Bernard Hollander, in his recent book on the mental functions of the brain, also concludes, after reviewing a large amount of evidence, that the frontal lobes are the seat of the higher mental faculties.

Müller,[1] in discussing the question of disturbance of intelligence following injuries to the frontal lobe, lays stress on the importance of excluding the presence of a diffuse disease of the cortex; and he also points out that care should be taken to investigate the question whether the patient had been of a neurotic character before the injury or the development of the tumour.

An important contribution to this subject has been recently made by Professor Francesco Durante.[2] He concludes from his observations:—(1) That lesions of the frontal lobes, especially those due to neoplasms, are nearly always accompanied by grave mental changes, and considers that this proves that the frontal lobes—especially the prefrontal—are to be looked upon as the seat of the highest mental functions; (2) That the cortical centre for hearing is situated in the temporal lobes, and that each centre is in relation with both the auditory nerves, but that the direct auditory bundle is very much less active and smaller than the crossed auditory bundle; (3) That the situation of the centre for general sensibility and for muscular sense is in the parietal lobes, and that disturbances of general sensibility and of the muscular sense may occur in the limbs independently of any disturbance of motility whatever.

The evidence upon which Professor Durante bases his conclusions as to the cortical localisation of general sensibility is very interesting. The patient had a notable bony depression

[1] *Deutsche Zeitschrift für Nervenheilkunde*, 1902, Bd. XXI., Heft 3-4.
[2] *British Medical Journal*, December 13, 1902.

corresponding with the right parietal eminence, and this depression was, by means of the topographical method of D'Antona, considered to be 3 cm. distant from, and behind, the Rolandic fissure ; that is to say, completely removed from the psychomotor zone and well in the parietal lobe. The patient had lost tactile, thermic, and painful sensibilities in the whole of his left upper extremity, so that he could bear, with his eyes bandaged, the contact of burning needles, and needles could be passed through skin and muscles without giving rise to pain. Stereognostic sensibilities were also lost. An operation was performed, and six hours afterwards all the various disturbances of sensibility disappeared. Professor Durante ends by stating that he considers operative surgery and pathological anatomy more useful than experimental physiology in the elucidation of the functions of the different regions of the brain, since the brains of animals in many respects cannot be compared with those of man.

## TYPHOID PSYCHOSES.

A paper on the Typhoid Psychoses, written by Dr. Clarence B. Farrar,[1] has appeared during the last year. Cases are recorded illustrating the psychoses which may appear at different stages of the disease, and which have been divided by Kraepelin into :—(i.) Psychoses of initial delirium ; (ii.) febrile psychoses ; and (iii.) asthenic psychoses.

Of these, the *initial delirium* is the rarest form, and is important both from a diagnostic and prognostic point of view ; for an early delirium may naturally obscure the true nature of the disease, and its presence is further thought to indicate a poor resistance on the part of the individual.

Dr. Farrar discusses the specific causation of the initial delirium, which clinically presents the general features of intoxication from various sources, and which in a number of instances has been confused with delirium tremens. Pathological results would appear to support the toxic theory, as swelling of the large pyramidal cells of the brain, with general chromatolysis, is said to have been found. The author of the paper does not think that these entirely explain the mental

[1] *American Journal of Insanity*, July, 1902.

symptoms, since analogous changes have been found in cases of confusional insanity where no specific poison was recognised, and also in cases of pneumonia and typhoid fever which presented no mental symptoms.

In connection with this question, it may be mentioned that the writer of this review, in conjunction with Mr. A. G. R. Foulerton,[1] made an experimental and pathological investigation concerning the action of pure typhoid toxine upon the cells of the central nervous system, and concluded that the pure toxine produced no effects which could be recognised by the Nissl method of staining; so that it would appear that even in the early delirium of typhoid fever the infection is already a mixed one, unless indeed some of the cell-changes are due to a high temperature and are not directly dependent upon any definite poison.

With regard to the unfavourable outlook in these cases of initial delirium, Dr. Farrar quotes Aschaffenburg, who observed a mortality of 50 per cent., and Raymond (quoted by Kraepelin), who found that 61·5 per cent. of the cases ended fatally.

The second class, viz., the *Febrile Psychoses*, are commoner, and may be divided into two groups—(i.) The true fever-deliria, which occur in direct relation to the rise of temperature and disappear as the temperature becomes normal; and (ii.) a less common variety in which the psychoses are not definitely associated with the fever, which they may outlast for months or years.

Lastly, during the convalescent period the *Asthenic Psychoses* may develop and may take various forms. The prognosis in this class is better than that in the initial delirium, but much less favourable than in the fever-psychoses.

In summing up, Dr. Farrar points out that, while typhoid fever may leave a patient without producing any psychic symptoms, it may on the other hand give rise to all gradations of mental disease. The severity of the symptoms is not necessarily proportionate to the degree of fever or to the intensity of the infection; but people of psychopathic inheritance are more prone to suffer than the mentally healthy. It is also said that a second or third attack is more likely to

[1] *Lancet*, April 21, 1900.

give rise to mental symptoms than the first. Finally, it is shown that the typhoid psychoses are not distinctive, either clinically or anatomically, for other forms of intoxication, exhaustion, anæmia, and the like, may produce similar conditions, and the susceptibility to mental disorder varies with the powers of resistance possessed by each individual.

Dr. G. F. Still,[1] in his interesting Goulstonian Lectures (1902), upon abnormal psychical conditions in children, showed that a morbid defect of moral control was often associated with physical diseases, and gave instances of cases occurring after typhoid fever, diphtheria, scarlet fever, and rheumatism, as well as after grosser lesions, such as cerebral tumour, meningitis, epilepsy, and others. The case which occurred after typhoid fever was that of a girl, aged 10, who had a severe attack complicated by otitis media. For several months afterwards the child, who had previously been well-behaved, was very disobedient and unruly, spiteful and passionate, while her general intellectual condition appeared to be normal.

### CENTRAL NERVOUS CHANGES IN ALCOHOLISM.

The changes occurring in the central nervous system in the neuritic disorders of chronic alcoholism have recently been investigated by Dr. Sidney John Cole.[2] A clinical and pathological account is given of three cases of peripheral neuritis, accompanied by mental symptoms, in all of which extensive changes were found in central neurons in addition to those belonging to the periphery; and he therefore concludes that the lesion of the peripheral nerves is only one of the many manifestations of the disease. Changes in the pyramidal cells of the cortex were found in all three cases; and the author considers that the mental disorders which he observed were doubtless related to these changes.

Some remarks are also made on the changes observed in the muscles, in which the essential change appears to be a fatty degeneration affecting individual fibres independently of interstitial fibrosis, which latter, commonly described as the characteristic change in neuritis, appears to be simply an end-product.

[1] *Lancet*, April 19, 1902.
[2] *Brain*, Autumn, 1902.

## PUERPERAL APHASIA.

Puerperal Aphasia is the title of an interesting paper by Dr. M. A. McIntyre Sinclair.[1] The author gives a full report of a case observed by himself, and an analysis of seventeen others collected from literature. From his examination of the recorded cases it appears that puerperal aphasia may be due to several causes, which have been previously classified by Poupon under two broad classes, viz., those due to a nervous origin, and those due to a vascular origin. While fully agreeing with the neurotic origin of some cases, Dr. Sinclair is inclined to think that Poupon laid too much stress on this factor, and that some of the cases attributed to this cause might fairly have been considered as vascular in origin. In the cases depending on vascular lesions, after those due to embolism or hæmorrhage have been excluded, there still remains a fair residuum in which the blood-vessels show no signs of degeneration, and in which there is no cardiac disease, no albuminuria, and no suspicion of the neurotic habit: in these Dr. Sinclair believes that the key to the situation lies in the composition of the blood itself, and the greater tendency which puerperal women have to the formation of clots within the vessels. In all of the collected cases, with one exception, the aphasia developed, either during the four last months of pregnancy or during the period immediately following delivery —a period which exactly corresponds with that in which numerous analyses of the blood have shown it to be most profoundly altered. The clinical aspects of these cases also appear to be in favour of thrombosis. Among other interesting facts Dr. Sinclair shows that there is a liability to recurrence in subsequent pregnancies, and that while the prognosis of the primary attack is fairly good, the outlook in recurrences is much less favourable.

[1] *Lancet*, July 26, 1902.

# Public Health.

## I.

### THE PREVENTION OF MEASLES.

By GEORGE NEWMAN, M.D.,

*Medical Officer of Health of the Metropolitan Borough of Finsbury.*

On February 20 of the present year the London County Council adopted the recommendation of its Public Health Committee to place measles under the "Dangerous Infectious Diseases" provisions of the Public Health (London) Act, 1891. The Committee in their report pointed out the prevalence and fatality of the disease in London; and, whilst unprepared at present to recommend notification, either compulsory or voluntary, expressed the opinion that the time had come to apply to measles the sections of the Act relating to dangerous infectious diseases, with the exception of section 66, which provides for removal to hospital. The Committee had arrived at this opinion in part owing to the advice of their own sanitary officers, and in part as a result of enquiry among the Metropolitan Borough Councils in December, 1900. An enquiry was addressed to the Borough Councils asking them to state whether they were in favour of the extension to measles of the provisions contained in the sections above mentioned. It appears that ten of the sanitary authorities approved the proposal, and seven disapproved. The recommendation of the Committee was therefore made and adopted by the Council, with the intention that the Order should come into force on April 1 next. Such an Order of the London County Council requires the ratification of the Local Government Board, but in all probability this will be forthcoming.

We are, therefore, to see definite statutory powers enforced in respect to measles in London, commencing in the present year. We may briefly state what the powers are. And first it may be said at once what they do not include. They do not include any form of compulsory notification or isolation.

On the other hand they do include a variety of powers having the object of removing, or circumscribing, infection from measles.

Thus section 60 gives power to sanitary authorities to require the cleansing and disinfection of infected premises, and the disinfection or destruction of infected articles, and contains other provisions as to compensation and shelter during disinfection. Under section 61 sanitary authorities can require bedding, clothing, &c., to be delivered up to them for disinfection, and must pay compensation for any unnecessary damage. Section 62 prohibits, under a penalty, the casting of infectious rubbish into ash-pits without previous disinfection.

Section 63 prohibits, under a penalty, persons from knowingly letting houses in which infected persons have been lodging, until such premises have been disinfected. Section 64 provides for a penalty on persons letting houses who make false statements as to infectious disease. Section 65 provides for a penalty on persons ceasing to occupy houses without disinfection or notice to owner, or making false answer.

Section 68 prohibits, under a penalty, the exposure of infected persons and things.

Section 69 prohibits infected persons from carrying on any occupation in such a manner as to be likely to spread disease.

Section 70 prohibits the conveyance of infected persons in public conveyances. Section 72 prohibits, in certain cases, the retention of the body of a person who has died of any dangerous infectious disease.

The body of a person who has died in hospital of any dangerous infectious disease may be removed only for burial under section 73; and section 74 deals with the disinfection of a public conveyance which has been used for carrying the body of a person who has died of any infectious disease.

There are two main channels by which under present circumstances the Sanitary Authority learns of the occurrence of measles. The first is by the death-returns, and the second by the school certification in accordance with the regulations of the London School Board. The first arrives too late to be of any service to the patient, although of value as indicating possible centres of infection. The second is unreliable, although

better than nothing. Notwithstanding the disadvantages under which Sanitary Authorities labour, we think the County Council has acted wisely in not pressing notification at the present time. As a matter of fact, the case for notification of measles has not yet been proved. During the past six or seven years a few (under 1 per cent.) of the Sanitary Authorities in England and Wales have included measles in the list of notifiable diseases. But from various special reports it appears that in nearly all of these cases the results have been on the whole unsatisfactory, and many of the towns and districts which adopted notification have since been compelled to abandon it. It has been found that notification is of comparatively little use on account of the fact that the disease is very highly infectious for several days before the appearance of the characteristic rash. Hence the notification-certificate arrives too late to be of value in adopting preventive measures to protect others in the infected household. Then, again, in large numbers of cases of measles a medical man is not called in to attend the patient. Therefore, many cases would escape notification, for the section laying onus upon the heads of households is rarely insisted upon.

It would be almost impossible, even were cases certified, to procure isolation either at home or in hospital. Even provided there was hospital accommodation sufficient for all the cases of measles occurring in London during the year, which in itself would mean enormous expense, there would be further difficulty, owing to the fact that the vast majority of the patients are infants.

Amongst the towns in which the experiment of notification has been tried are Newcastle-on-Tyne and Edinburgh. In Newcastle, from August 26, 1896, to August 26, 1898, Dr. Armstrong, the Medical Officer of Health, received 7,680 notifications of measles, and 3,746 of whooping-cough, which was also included in the the temporary arrangement. The total amount payable to medical practitioners for the foregoing was £1,221 9s., for which measles was debited with £846 14s. 6d. and whooping-cough with £374 14s. 6d. In addition to this there were certain incidental expenses of disinfection and administration amounting to £660. The total cost of the experiment was, therefore, £1,881. Every case of measles

reported was visited, inquired into, and otherwise dealt with by the Health Department in the manner usual with other infectious diseases. The arrangement facilitated school-closure and school-disinfection, and was in other ways an advantage, but the outcome of the notification was not to produce any reduction of the disease. The Edinburgh experiment lasted from 1880 to 1901. Measles was known to occur in epidemic form, alternating with short periods of quiescence, and considerable harm and inconvenience were occasioned to the city as an educational centre. Accordingly it was decided to include measles in the Edinburgh Municipal and Police Act, 1879, as a notifiable disease, and as such it remained until the end of 1901. The result is as follows[1]:—

| Years. | 1880. | 1881. | 1882. | 1883. | 1884. | 1885. | 1886. | 1887. | 1888. | 1889. | 1890. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Cases - | 3,216 | 684 | 4,100 | 2,984 | 2,476 | 958 | 5,833 | 2,369 | 3,836 | 3,064 | 4,761 |
| Deaths - | 185 | 11 | 87 | 138 | 80 | 19 | 178 | 42 | 98 | 101 | 241 |
| Percentage of deaths to cases. | 5·9 | 1·5 | 2·1 | 4·6 | 3·2 | 1·9 | 3·0 | 1·7 | 2·5 | 3·2 | 5·0 |

*(Continued)*

| Years. | 1891. | 1892. | 1893. | 1894. | 1895. | 1896. | 1897. | 1898. | 1899. | 1900. | 1901. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Cases - | 2,169 | 7,801 | 2,514 | 1,039 | 6,940 | 2,090 | 7,924 | 4,395 | 3,600 | 4,397 | 5,384 |
| Deaths - | 70 | 396 | 151 | 12 | 243 | 38 | 293 | 134 | 82 | 126 | 169 |
| Percentage of deaths to cases. | 3·2 | 5·0 | 6·0 | 1·1 | 3·5 | 1·8 | 3·6 | 3·0 | 2·2 | 2·8 | 3·1 |

It will be seen that there is little or no reduction in the prevalence of the disease. And as Sir Henry Littlejohn points out,[2] during the last three years there has been no marked biennial periodicity, the three years 1899, 1900, and 1901 having each been characterised by an epidemic of measles, even though in lesser degree than the outbursts in 1892,

[1] *Annual Report of the Medical Officer of Health of the City of Edinburgh*, 1901, p. 34.

[2] *Ibid.*, p. 41.

1895, and 1897. In view of these figures it may be remarked further that another of the interesting results obtained from an exact record of notifications is to be found in the comparative figures in relation to social conditions. For this purpose the City of Edinburgh is divided into three districts :— (1) The Old Town in which the sanitary surroundings and social condition of the people is much worse than in (2) the New Town, or in (3) the Southern District, where the inhabitants live largely in villas and self-contained houses in contradistinction to tenements—a circumstance of course less favourable to the spread of such a disease as measles.

| | New Town. | | Old Town. | | Southern Districts. | |
|---|---|---|---|---|---|---|
| | Attack-Rate per 1,000. | Percentage of Deaths to Cases. | Attack-Rate per 1,000. | Percentage of Deaths to Cases. | Attack-Rate per 1,000. | Percentage of Deaths to Cases. |
| 1898 - | 11·7 | 1·5 | 19·8 | 4·7 | 13·1 | 0·9 |
| 1899 - | 16·0 | 1·8 | 8·2 | 4·1 | 6·7 | 0·4 |
| 1900 - | 12·1 | 2·6 | 19·7 | 4·0 | 10·6 | 0·1 |
| 1901 - | 19·5 | 2·5 | 16·2 | 5·0 | 12·7 | 0·6 |

These figures indicate that, while the prevalence of the disease may show little variation in different parts of a town, the mortality is greatly affected by the social condition and sanitary surroundings of the inhabitants. Such figures are full of interest, and yet the justification for notification is wanting. "After twenty years' experience of notification (of measles)," wrote Sir Henry Littlejohn in 1901, "and from the knowledge thus obtained of the natural history and modes of dissemination of the infectious material, I have come to the conclusion that under existing conditions of hospital accommodation, and power at present possessed for securing compulsory isolation of patients in hospital, it is practically impossible to exert any appreciable effect upon the prevalence of this disease." At the same time he admits that his personal feeling is "in favour of the retention of notification of measles on the ground that the more a sanitary authority knows of the existence of a disease in a district the

better." Such was the end of the experiment in Edinburgh, favoured though it was by the removal of some notified cases to hospital.

Much the same results as regards fatality occur in London as in Edinburgh. In 1901 the eastern districts of the metropolis had the highest death-rate (0·61), and the western group the lowest (0·29). Southwark and Battersea had the highest among the boroughs (0·78), and Hampstead the lowest (0·01). As Mr. Shirley Murphy points out in the Annual Report for 1901, which he has just issued,[1] in any comparison of the distribution of measles-mortality due regard should be had to the age-incidence, both of attack and of fatality. But even when this is considered, districts like Southwark and Battersea fare worst, and Hampstead retains the lowest death-rate. The order of the boroughs, however, in relation to measles-mortality at "all ages" is somewhat altered if the mortality at ages 0–5 years be adopted for purposes of comparison. But generally speaking the age-constitution of the poorer and more overcrowded boroughs tends to place them in a less favourable position when the death-rates from measles at "all ages" are compared than when the death-rates at ages 0–5 alone are considered; for in this classification it will be found that the nine districts having the highest death-rate from measles at "all ages" are Battersea, Southwark, Bethnal Green, Shoreditch, Bermondsey, Stepney, Camberwell, Greenwich, and Poplar—districts, all of them, in which one of the chief factors is unquestionably the social condition.

Turning for a moment to corrected measles death-rates per 1,000 living, we find only very slight, if any, improvement in London during the last 10 years :—

| —— | 1891. | 1892. | 1893. | 1894. | 1895. | 1896. | 1897. | 1898. | 1899. | 1900. | 1901. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Death-rates per 1,000 living in London. | 0·43 | 0·79 | 0·38 | 0·76 | 0·60 | 0·82 | 0·43 | 0·69 | 0·48 | 0·43 | 0·43 |

For the 10 years 1891–1900 the average is 0·58. In 1901

[1] *Tenth Annual Report of the Medical Officer of Health of the Administrative County of London*, 1901, pp. 24–28.

Manchester, Liverpool, Birmingham, Leeds, Sheffield, and West Ham were among districts having a higher measles death-rate than London.

Such being the general facts, and notification and isolation being, for the present at all events, set on one side, the question naturally arises as to what, if anything, can be done. Dr. Theodore Thomson reported in the 24th Annual Report of the Local Government Board in an exhaustive manner as to the available means at our disposal. These may be briefly summarised as follows:—

(1) Compulsory notification [*a*] for all cases; [*b*] for first cases in a house only. (2) Voluntary notification by medical men, clergy, district visitors, school teachers, &c. (3) [*a*] Closing of day and Sunday schools; [*b*] exclusion of members of affected households from schools. (4) Prevention of persons attending work where infection is likely to be spread, as by hawkers, milk-sellers, teachers, tailors. (5) Better isolation at home. (6) Provision of hospital accommodation. (7) Disinfection of invaded households. (8) Preventing the issue of books from public libraries to infected houses. (9) Instruction of the public by leaflets and other means.

Nos. 1, 2, and 6 are practically out of the question in most districts. No. 3 is in vogue everywhere, although often exercised too late to be of much preventive value. The remainder come in a general way within the rights and duties of local authorities. In all probability it is to general conditions that we must look for the successful prevention of measles, and chiefly to three—namely, education, school-closure, and disinfection. The prevention of complications, especially broncho-pneumonia, is the most important point, clinically, in the treatment of the disease. Cleanliness and ventilation, the seriousness of the disease, and its marked infectivity are the main topics upon which the public require education. Simple and, it must be added, short statements printed in leaflet-form and widely distributed have doubtless done good. Health visitors have probably, in the long run, done better. Both may be combined; and measles and whooping-cough are unquestionably two diseases in which this somewhat exceptional method of prevention is justifiable. The placing of measles among "dangerous infectious diseases,"

with the consequent warnings that would be made during times of epidemic, will lead the public to look more seriously upon the disease and to take steps to avoid the fatal complications which ensue from improper exposure and want of care. They will learn that in the mortality-returns it is generally the complications following measles that really cause the death of the patient.

In the second place there is unanimity of opinion that school notification and school-closure are powerful preventive methods if rightly applied. We require an extension to all denominational and private schools, as far as possible, of the plan already in vogue by which Board School teachers inform the medical officer of health of any cases of measles occurring among the children in their schools. There can be no doubt that measles is spread directly through the agency of schools. From these data we should know the time when it would be wise or necessary to exclude certain children from school, to visit absentees suffering from measles, to deal with infected houses, or to close schools, especially infants' departments. This method has been put into practice, with considerable success, by a large number of sanitary authorities. The idea is prevalent in some quarters that the closure of schools is of little avail in the prevention of epidemics, because if children are not in schools they are playing about together in the courtyards and streets. But there is very considerable difference between children crowded together in a school-room, in confined air-space, and children playing about in the open air. In particular, school-closure must apply to infants' departments, and it must be applied as soon as the incidence of the disease has reached, say, 10 per cent. of the average attendance, although no hard-and-fast rule can be laid down. To close schools much earlier than this is to run the risk of the disease breaking out again when the school reopens. To close them much later is useless as a preventive measure. After all, the question of school-closure involves the assumption that infection is due to infectious schoolrooms or infectious school-mates, and both must be borne in mind in deciding whether to isolate infected cases only or close the school. During 1901 between 50 and 60 schools or classes were closed in London in pursuance of this principle.

Lastly, there is disinfection. If properly and effectually carried out, this will operate in a directly beneficial manner. This was especially noticed in infant departments of several large elementary schools in Newcastle. In one such school yielding 44 cases in the 3 weeks immediately preceding the disinfection of the school, after the first fortnight the number fell to a total of 3 in 13 weeks. In another parallel case the number fell from 56 in 6 weeks, before disinfection, to 4 in the 12 weeks after. In a third, the decrease was from 12 to an average of 2 per week. Similar evidence of the efficacy of thorough disinfection after measles in schools is obtainable in many quarters.[1]

The prevention and control of measles is, like that of whooping-cough or phthisis, largely in the hands of the public themselves; and yet the enormous annual death-roll of such diseases calls for every effort on behalf of the sanitary authority, which is at all likely to prove practicable and efficacious. Hence it is to be hoped that the new application of statutory powers in London for limiting, and if possible checking, the spread of measles-infection will justify itself by its results. The experiment will be watched with interest, especially by those sanitary authorities which have in the past attempted to grapple with the disease.

## II.

## THE IMPERIAL VACCINATION LEAGUE.

By EDWARD J. EDWARDES, M.D., M.R.C.P. (Lond.),

*Secretary to the League.*

THIS League has already had such good effect in influencing public opinion that some account of its work may be acceptable to the readers of THE PRACTITIONER. It was organised on June 30 1902, in the house of Mrs. Garrett Anderson, M.D., the present Honorary Secretary of the League.

[1] For methods of school-disinfection and suitable disinfectants to use, *see* THE PRACTITIONER, September, 1902, p. 300. "Practical Disinfection in Schools," by A. C. Houston, M.B., D.Sc.

It is in friendly alliance and heartily coöperates with the Jenner Society of Gloucester, which was founded a few years ago, and which has done so much for the cause of vaccination under the fostering care of Dr. Francis T. Bond. Attempts were made, indeed, to amalgamate the Jenner Society with the Vaccination League, which had its office at 110, Strand, and which was founded by Mr. J. T. Carrington during the recent London epidemic. But inasmuch as Jenner was a Gloucestershire man, the society which bears his name was felt to be a memorial to his honour in his native county, while at the same time a Vaccination League in the metropolis had become a necessity. Hence the Imperial Vaccination League was founded as a complete reorganisation of the former Vaccination League of the Strand.

On December 12, 1902, the League held its first general meeting in the Westminster Palace Hotel, when the Duke of Northumberland presided. Among the speakers on that occasion were the Bishop of Stepney, Sir Michael Foster, M.P., and Mr. R. B. Haldane, M.P., and a strong executive committee was appointed having Sir James Crichton-Browne for its chairman. In fact, the League is not a medical society, but claims to represent educated lay opinion. The common sense of the nation revolts at last against the humiliating position which this country occupies as regards vaccination and the recurrence of severe epidemics.

Any Englishman who reflects upon the causes which have necessitated the formation of the Imperial Vaccination League, and is led to enquire seriously into the subject with an unprejudiced mind, will feel somewhat ashamed of the apathy of most of his countrymen, and the open hostility of many, towards vaccination. The introduction of vaccination was due to an Englishman ; and yet throughout the whole of the century which has intervened since vaccination first came into use England has lagged far behind other countries in appreciating its importance, and has not derived that degree of benefit which other nations, more intelligent it its use, have experienced. The causes of this are deeply rooted in the English character. In the first place we are a nation of fighters in the cause of individual liberty, and vaccination has always seemed to many to be an unwarrantable invasion

of the hearth. In the next place we are very loth to initiate legislation on any subject, and much prefer to let other nations make experiments for us. We build our political constitution very slowly, meaning it to endure. Lastly, England, owing to this last characteristic, may be called the land of political compromise. We hate legislation *en bloc*, and prefer the gradual modification of existing institutions, rather than their sudden disruption and removal.

In the first two decades of the last century, the storm of abuse which assailed Jenner seems to have prevented the legislature from any attempt towards making vaccination universally obligatory, though several other countries took advantage of the first enthusiasm to do so, and with lasting good results; *e.g.*, Bavaria as early as 1807, Denmark in 1810, Sweden in 1816, and several German States about this time. After this the recurrence of serious epidemics of small-pox caused doubts and endless discussions about vaccination, and legislation was delayed another quarter of a century. It was not till 1853 that the vaccination of infants was made obligatory by law in this country—gratuitous vaccination had already been afforded by the Acts of 1840 and 1841. Then came the consolidating Act of 1867; and then, after a Select Committee had reported on the working of this, the Act of 1871, which required boards of guardians to appoint persons who should prosecute defaulters. Lastly, in 1896, we have the five-years' Act of Mr. Balfour, which accordingly will expire at the end of the present year. Hence the origin of the Imperial Vaccination League.

After a hundred years of vaccination; after a Royal Commission had thrashed out the whole subject and had formally concluded that re-vaccination was necessary; after Germany had enjoyed compulsory re-vaccination for 20 years, and had thereby abolished epidemics from her cities, this country not only failed to initiate systematic re-vaccination of school-children, but has actually abolished compulsory vaccination altogether, by the enactment of the "conscientious objection" clause. This wonderful clause may hereafter prove to be a thorn in the side of our political leaders, for it may prove to be a grave breach in our political organisation by constituting a precedent.

But the League does not propose to agitate against this clause, for two simple reasons. Firstly, vaccinations in proportion to births have increased during the last few years. True, the increase is only slight, and this slight increase may be due to other causes—the domiciliary visits and the use of calf-lymph. The latest official return on the subject shows that in England and Wales the successful primary vaccinations during the four years 1898–1901 were respectively 54, 72, 73, and 76·5 per cent. of the births. Thus there has been no great increase since 1899. If we exclude London the percentages are 55, 73, 74, 75 respectively; while if we consider London alone the figures are 48, 65, 66, 85. This last percentage is due to the very great increase of vaccinations in London during the recent epidemic. Secondly, this clause, absurd and illogical as it is, has done good in another important aspect. It has stopped the making of martyrs. John Bull, to use Dr. Acland's expression, is an animal more easily led than driven; in fact, he will not be driven.

With regard to the work done by the League, a sub-committee, of which Mr. J. Smith Whitaker was chairman, was appointed to consider the following question: Is general compulsory re-vaccination desirable at school age? The conclusions of the executive committee on this question are:—

1.—(*a.*) That the experience of this and other countries which have enforced general primary vaccination of infants shows that such vaccination, while greatly reducing the loss to the community through smallpox, does not afford life-long protection to the individual, and therefore does not sufficiently protect the community.

(*b.*) The experience of this country in respect of re-vaccination shows that the protection of the individual, even in the presence of epidemic smallpox, is effectually renewed by this means.

(*c.*) In those countries which have adopted general compulsory re-vaccination of children before leaving school practically complete protection of the community against epidemic smallpox is obtained.

2. The committee recommend the age of 12 as that most suitable for re-vaccination. In the presence of epidemic

smallpox it is advisable to lower the age to 10, at the discretion of the sanitary authority.

3. The committee acquiesces for the present in the recognition of "conscientious objection" to re-vaccination as to primary vaccination.

4. With respect to machinery, the school register should in primary schools be made the basis of procedure, and the committee recommends that the information should be obtained through the agency of the School Attendance Committee.

*Supplementary.*—Though not strictly within the scope of the reference to the sub-committee, which related to children of school age only, several members of the sub-committee desire to suggest that re-vaccination at school age should be supplemented by a system of re-vaccination of smallpox contacts.

A sub-committee, presided over by Dr. R. Dudfield, was appointed to consider a second question, viz., what authority, if any, for the administration of the Vaccination Act should be substituted for the guardians of the poor? The conclusions of the executive committee were as follows:—

1.—(*a.*) It is desirable,—That the administration of the vaccination laws be transferred from the Poor Law to some other authority charged with the public health functions.

(*b.*) That, in the event of default being made by any local authority, the Local Government Board be empowered to appoint officers to carry on the administration of the Acts independently of the local authority; and recover the expenses from such authority; and

(*c.*) That security of tenure be given both to the public vaccinator and the vaccination officer.

2. That the Local Government Board do prescribe a standard of efficient vaccination.

The reference to the third sub-committee, over which Dr. Theodore Dyke Acland presided, was:—

How far is the present supply of glycerinated calf-lymph reliable and sufficient, and what, if any, alteration in the existing arrangements could be made to enable every vaccinator, private or public, to obtain lymph prepared under

conditions which give a reasonable guarantee of its purity and efficiency ?

The conclusions of the committee were that :—

1. The present conditions under which glycerinated calf-lymph is prepared and sold by private makers and vendors are unsatisfactory, and it is desirable that all establishments for the preparation of calf-lymph in England should be under Government inspection and control.

2. It is desirable that the national vaccine establishment should be large enough to supply lymph to all qualified practitioners who may desire to use it on such terms as may from time to time be found necessary.

3. It is desirable that vaccine lymph should be sold only by licensed persons, and that it should be obligatory to state clearly on every package the origin of the lymph, the method and date of its preparation, and the length of time within which it ought to be used.

The sub-committee are making enquiries which will throw light on the position which England occupies in comparison with other countries, both as regards the issue of vaccine lymph from Government institutions, and as regards the control and inspection of private institutions for the preparation or sale of lymph.

These conclusions derive additional weight from the fact that chairmen of the three sub-committees were free to invite whom they pleased to be members of their respective committees, and men of special knowledge and experience in each subject were selected, while the most divergent views obtained a fair hearing.

Regarding the "authority," it may be useful to remind the reader of a few considerations put forward by the Royal Commission, by means of a few quotations :—

"Whilst in England and Wales there are only 648 vaccination authorities, the sanitary authorities exceed 1,700 in number." And, again, as regards a complete transference of vaccination duties to county councils, "If, then, any transfer to the county councils of the duty now incumbent on the guardians or other local bodies were deemed expedient, we think it would be found requisite to transfer the duty

altogether. It is not certain that a change of the nature we are considering would lead on the whole to a more complete enforcement of the law relating to vaccination. In some cases it might do so; but, on the other hand, *it might happen that a majority of a county council would be elected to support an anti-vaccination policy*, in which case the area within which the vaccination laws were not enforced might be extended." (Italics added.)

As regards the Local Government Board, "It would not, in our opinion, be practicable altogether to withdraw the duty of proceeding against defaulters from local authorities and to vest it in the Local Government Board. If that Board is to discharge the duty at all, its intervention would have to be confined to cases in which the local authority failed to enforce the law." Since these words were penned (1896) a decision of the High Courts has made the vaccination registrar (the "vaccination officer") master of the situation. He is free to prosecute whether the guardians approve or not.

These considerations are brought forward merely to show the difficulty of the subject.

Two chief requirements for the nation stand out clearly, viz.:—(1) The obligatory re-vaccination of all school-children at the age of 12 or thereabouts; and (2) an abundant supply of glycerinated calf-lymph prepared in State laboratories for the purpose. These two needs were put before Mr. Walter Long on the occasion of the deputation of January 14 of this year. On that occasion Mr. Long paid the League a compliment by remarking that it was a pity it had not come into existence sooner. He referred especially to the heckling at election meetings which candidates for Parliament have so often had to undergo at the hands of opponents of vaccination, when a satisfactory answer is difficult to make on the spur of the moment. It is to be hoped that such candidates will be less troubled in this respect in future.

Probably never before in the history of vaccination has such a representative list of names in its favour been brought together as that which appears on the prospectus of the League. "Law, Divinity, Medicine, Miscellaneous" is an old classification; but here we find in addition names of men who have achieved world-wide fame in the realms of pure Science,

*e.g.*, Lord Kelvin, Professor Dewar, and others. Art is represented also; and this is fitting, for vaccination has saved the cheek of beauty from the hateful pock-marks so common in former times.

If we consider what has been done in the matter of vaccination abroad, we find that the following countries have adopted compulsory re-vaccination :—Germany (1874), Hungary (1877), Italy (1889–1891), Roumania, and Japan. To these must now be added France, where, since February 15 of this year, thrice-vaccination has been made universal, viz., in the 1st, the 5th, and the 20th years of life. It is high time that the country which gave vaccination to the world should reap a fuller advantage therefrom.

Let us consider the cost of an epidemic. The recent London epidemic has cost over half a million pounds sterling in direct expenses incurred by the Metropolitan Asylums Board, to say nothing of the loss of 1,500 lives, and the incidental immense losses due to the epidemic. The interest on £500,000 at 3 per cent. is £15,000. Now, the cost of the Berlin State Calf-Lymph Institution for one recent year amounted in all to £650, and a supply of lymph was obtained sufficient for 427,000—nearly half a million—vaccinations. There are 22 such Institutions in Germany: we have one. Some of these cost much less than the above, £200 to £500 yearly. Let us suppose that everything in this country costs much more than in any other country—let us say twice or even thrice as much—a State laboratory for calf-lymph on this scale would cost £2,000 yearly to keep up. Thus, for our £15,000—a perpetual endowment, be it remembered—we should obtain seven or eight perfectly equipped institutions. In short, the United Kingdom could get rid of smallpox epidemics altogether for less than the cost of one such visitation in one city, the metropolis.

It is hoped that every medical man will take an active part in furthering the propaganda of the League, and will make a point of impressing his representative in Parliament with the importance of the subject during the present year. The numerous and weighty signatures from headmasters of public schools, prominent shipowners and other representatives of commerce, artists, leaders of society, &c., which where

obtained by the energetic effort of the Honorary Secretary of the League, and presented to Mr. Walter Long, afford an instance of what can be done. These signatures were appended to the following declaration :—

"Believing that in vaccination and re-vaccination we possess the best protection against epidemic small-pox, I should heartily welcome legislation making re-vaccination at school age obligatory on all but the children of conscientious objectors or those who may be for a time excused on the ground of ill-health."

The present writer will be glad to send printed voucher-forms to anyone who will take the trouble to apply for them. Signatures by prominent men are especially valuable.

Hitherto the opponents of vaccination have had the ear of the public almost to themselves; it is high time that the main facts of the case should be well known by everyone, or at least readily accessible. The work to be done is enormous, for the prevailing ignorance of vaccination and its results is incredible. The writer attended a meeting of a debating society quite recently in a suburb of London, and was amazed to hear one speaker strongly object to vaccination because he had a slight squint, and someone had told him that this was due to vaccination! Being the most eloquent speaker in the room he carried his whole audience with him for the time he spoke.

In conclusion, the work which lies before the League, now that the sub-committees have reported, is the diffusion of a better knowledge of smallpox and vaccination amongst the community at large, and to this end the League will direct its efforts.

# Reviews of Books.

*A Text-book of the Science and Art of Obstetrics.* By HENRY J. GARRIGUES, A.M., M.D., Consulting Surgeon to the New York Maternity Hospital, &c. Philadelphia and London: J. B. Lippincott & Co. 1902. Price 25s.

THIS is a large and profusely illustrated American text-book of midwifery, resembling both in external and in internal appearance the author's well-known *Text-book of Diseases of Women.* To quote from the preface, "The aim of the author has been strictly to write a text-book, not a book of reference." We doubt if there is any excuse for the existence of any book so large as this, unless it is a book of reference, which the present volume certainly is not. Further, in spite of its 830 pages, we have failed to find full and satisfying descriptions of many of the important subjects in Obstetrics. Indeed most of the serious matters are treated in a short and scrappy manner, while innumerable minor topics are somewhat discursively dealt with. The impression gained by reading many pages is that the author has ample knowledge, but fails to communicate it to the reader. He flits gently and gracefully from one topic to the next, as if they were as familiar to the student as to himself. Eclampsia is neglected in seven pages. The whole point is missed in dealing with Placenta prævia, &c., while "Rupture of the Circular Sinus of the Placenta" receives almost as much attention as "Accidental Hæmorrhage." Under "Post-partum Hæmorrhage" that subject is mixed up with bleeding during the third stage of labour, and also with hæmorrhage from lacerations of the parturient canal: thus the removal of the placenta is recommended as a part of the treatment of post-partum hæmorrhage. Beyond this want of proportion and certain irritating features in arrangement, we have no fault to find. Most of the matter is sound and readable. The following remarks may interest British readers at the present time:—"The institution of midwives is a remnant of barbaric times, a blot on our civilisation which ought to be wiped out as soon as

possible. As America has led the world in establishing colleges for the education of women physicians, let it also form the vanguard in a war of extermination against those pestiferous remnants of pre-antiseptic days, midwives and schools of midwifery. To recognise midwives and give them a legal standing would be to go back to the times when stone-cutters, oculists, bonesetters, herniotomists, and other so-called specialists plied their trade under the eyes of the law." Amongst the five hundred and four illustrations there are many of great beauty, several of the coloured plates being excellent. There are also many of the usual diagrams finished up to look like drawings from nature, but for these the artist is doubtless more to blame than the author. We do not consider that the present volume will in any way bear comparison with the author's *Diseases of Women*. The best chapters are those dealing with "Obstetric Operations."

*The Journal of Obstetrics and Gynæcology of the British Empire.* Vol. I. January to June, 1902. Pp. 700. London: Baillière, Tindall, and Cox.

THE first volume promises well for the future of this new publication, which was started to provide a special British journal devoted to midwifery and diseases of women, independent of any society. This volume shows that the editors have carried out their intention of making the publication a full and impartial record of British work, and a summary of contemporary thought and achievement in obstetrics and gynæcology throughout the world. Many of the original articles are of great interest and importance. These are indeed so numerous that individual reference to them is impossible. Each number also contains a full critical review of the recent literature of some important subject. Thus Lea deals with the subject of "Spinal anæsthesia by cocaine"; Eden discusses the theory of toxæmia of pregnancy; Donald reviews the operative treatment of prolapse of the uterus and vagina; Fothergill describes some recent contributions on placentation; Wilson treats of the results of vaginal operations for cancer of the uterus; and Robinson takes up the bacteriology of the uterus and vagina during labour and the puerperium. Another

very useful feature is a monthly "Index Obstetricus," which gives the titles and references of all the important papers in the subject which have appeared during the previous month. The journal further gives reports of the meetings of the various obstetrical and gynæcological societies, and also abstracts of the more important communications published in the foreign journals. There are numerous well-executed illustrations. The thanks of all interested in midwifery and diseases of women are due to the promoters of this new journal, and especially to Mr. Alban Doran, the editor, and Dr. T. W. Eden, the secretary and sub-editor. All who wish to keep abreast of progress in this branch of medicine will find themselves compelled to read this publication, to which we wish a brilliant and successful future.

*The Thompson Yates Laboratories Report.* Vol. IV. Part II. 1902. Edited by ROBERT BOYCE and C. S. SHERRINGTON. University Press of Liverpool. 20s.

THIS prettily-bound volume contains papers on a wide range of subjects, and shows that these new laboratories are rapidly advancing our knowledge of physiology and pathology. Professor Sherrington's and Dr. Grünbaum's observations on the physiology of the cerebral cortex of some of the higher apes are reprinted from the Proceedings of the Royal Society, while J. S. Macdonald contributes an elaborate paper of 130 pages on the injury-current of nerves. Dr. E. H. Hume gives a description of a case of paratyphoid fever and a summary of 14 other cases.

Mr. Dutton, Walter Myers Fellow, gives a detailed account entitled Preliminary Note on a Trypanosome in the Blood of Man. In this instance it appeared to give rise to general weakness, irregular fever, splenic enlargement, and œdema, especially about the eyes. This interesting contribution is well illustrated, and notice should be specially directed to a coloured drawing of Trypanosoma gambiense (× 2,100) from a preparation stained by Romanowsky's method. This article recalls the recent discussion as to priority in the medical papers. The volume concludes with the Report of the Yellow Fever Expedition to Para by H. E. Durham.

*Reports of the Society for the Study of Disease in Children.* Vol. II. Session of 1901–1902. Edited by GEORGE CARPENTER, M.D. London: J. & A. Churchill. Price 12s. 6d. nett.

THE volume of Reports before us contains several papers of considerable interest. Perhaps the most important and complete is that on "Primary Osteoma of the Brain," by Mr. Thomson Walker. Other notable articles are those by Mr. Tubby, on "Paralysis treated by Muscle-grafting," which is illustrated by a number of drawings, and by Dr. C. N. Gwynne on "A Case of Congenital Dilatation of the Colon." These by no means exhaust the valuable matter in the book. We wish this comparatively young society every success for the future, and feel confident that it will attain it, if all its volumes contain material of the same high standard as the second.

# Notes by the Way.

**Alcohol Once More.**

THE question of the use and abuse of alcohol was thoroughly thrashed out in a series of articles in the November (1902) number of THE PRACTITIONER, but we make no excuse for returning to it once more, so great is its importance in our national life. The evils wrought by alcoholic excess can scarcely be exaggerated, even by the most fanatical advocate of teetotalism, and no one who is brought into contact with these evils, as all medical men necessarily are, can fail to be profoundly interested in any attempt to deal with the victims of the habit by legal enactment. The history of English legislation on the subject of chronic inebriates is instructing. The first attempt to deal with them was made in the "Habitual Drunkards Act, 1879," by which the establishment of retreats was first legalised, patients being admitted to them on their own "request for reception," attested by a justice of the peace, and accompanied by a statutory declaration by two friends of the inebriate to the effect that he was a chronic drunkard. Under this Act the patient may be detained for a period not exceeding two years. This Act of 1879 was made permanent, and amended in a few slight details, by "The Inebriates Act of 1888."

The first statute which recognised the principle of compulsion as applicable to confirmed drunkards was the "Inebriates Act of 1898," by which those who committed crimes under the influence of drink could be sent to a reformatory, either in lieu of imprisonment or in addition to such a sentence, while those who were repeatedly convicted of being "drunk and disorderly" could also be thus treated, but only in place of other punishment.

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**Report on Retreats under the Inebriate Acts.**

THE recently-issued Report of Dr. Branthwaite, the Inspector under the Inebriate Acts, for the year 1901 affords some interesting reading, and forms a very valuable contribution to the study of the problems presented

by the cure of drunkenness. We find that the number of institutions for the detention and treatment of Inebriates has lately increased, and that in particular those maintained by philanthropic bodies, for the benefit of patients who cannot afford to pay much for their treatment, have added to their numbers. This is a very satisfactory state of affairs. There can be little doubt that the demand for such homes will increase as the advantages of the system are more widely appreciated. Twelve of such institutions are now available for the reception of patients of moderate means.

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**Consent of the Patient Necessary.**

IT is well to bear in mind that it is not possible to send a patient to one of these retreats against his or her will. On this point there appears to be a good deal of misconception in the minds of the public. Many enquiries are made by friends and relations of inebriates with regard to placing them in homes, when the patients themselves are not willing to undergo the treatment; and considerable disappointment results. It is only in the case of drunkards who are guilty of some offence against the law that detention against their will can be enforced. Thus an habitual drunkard who commits offences punishable with imprisonment or penal servitude, or who has been convicted three times previously of being drunk and disorderly, &c., may be sent to an inebriate reformatory for a period not exceeding three years; while under the "Prevention of Cruelty to Children Act, 1894," an habitual drunkard who is convicted of cruelty under the Act may be ordered to be detained in a retreat in lieu of imprisonment. But even in this last case the order can only be made with the offender's consent.

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**Drug-Specifics for Alcoholism.**

A PASSAGE may well be quoted from the Inspector's report, wherein he deals with the question of secret and specific remedies for drunkenness. He says:—"I have recently had occasion to make enquiries with regard to certain of the secret remedies and drug specifics which are from time to time vaunted as cures for inebriety; but I have yet to find one which will

bear the test of strict investigation, or one where statistics of 'cures' can be supported by trustworthy evidence. There is no royal road to 'cure' for the confirmed inebriate, he has to be broken from his habit, brought back to physical health, and taught by moral influence to live his life without resort to alcohol in any shape or form. I am quite in accord with those who insist, as a first principle, upon the value of long-continued abstinence. . . ." This is certainly an important pronouncement by so competent an authority, and should be taken to heart. The so-called "cures" for alcoholism are now very numerous; and there can be little doubt that many patients have recourse to them, and thereby tend in many cases to fall into the hands of persons of very doubtful character.

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**Homes for the Destitute.**

THE Inspector refers, as to an urgent matter, to the need that exists for the provision of homes to which those may go who are unable to afford the prices charged by the existing retreats. Even homes which are maintained by charitable organisations are obliged to charge a certain amount for board and lodging, and this is more than the very poor can pay. "We want accommodation for the wife of the shopkeeper, artisan, or labourer; the wife of the man who has a family and home to keep together, and who, given the utmost industry and sobriety, has barely sufficient wherewith to do it. We want to find accommodation for the man himself, and also for men of a better status, who have lost their positions without hope of recovering lost ground except by renewed sobriety." Here then is a great opening for the well-directed philanthropy of private individuals. Chronic inebriates may not be a very attractive class to expend charity upon, but there can be no manner of doubt that an enormous amount of good might be done by a reasonable expenditure in this direction.

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**Prospect of Cure as a Result of Treatment.**

IT is difficult to speak at all certainly of the prospect of a permanent cure in the case of alcoholic patients, and it is well not to be too sanguine. Thus the Inspector writes: —"The word 'cure' in relation to inebriety is not one which

can safely be used: it conveys an impression of security which, unfortunately, is unwarranted. An inebriate may be 'broken off' his habit, he may be kept for months from all taste of liquor, and he may, during that time, acquire sufficient self-control to continue to abstain, even in the face of that temptation which must subsequently accompany the full liberty of ordinary life. I have known many instances of recovery to this extent; such a one cannot, however, be justly designated as 'cured,' for he still retains a condition which differs from that of an ordinary individual. The latter is able to take a glass of wine at dinner without the production thereby of an uncontrollable desire for excess; whereas such an indulgence in the case of a 'cured' inebriate would almost certainly undo the advantage gained from years of abstinence, and cause a complete reversion, in a few hours, to his original state. After many years this tendency *may* die out absolutely, or at any rate become less, but I never met with an authenticated instance of an ex-inebriate who, in later years, returned to the use of alcohol in any form without at least occasionally lapsing into a condition of insobriety." Statistics of the proportion of such "cures" as are possible are difficult to obtain, but it may be taken that among cases treated at these institutions 25 to 30 per cent. come under this category. A retreat which can show a percentage of the former figure may be considered to be doing good work.

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**Prospects of Cure in Women.**

It is often said that when a woman has once taken to drink she is altogether "past praying for"—that no durable reformation is within the bounds of possibility. This is not the case, fortunately, according to the report before us. The Inspector speaks of the view as "not only unjust and cruel, but entirely erroneous." "Such expressions . . . do incalculable harm by instilling into the minds of inebriate women the hopelessness of struggling against their failing. . . . When they are apparently reformed nobody believes them; they are received back into their homes on sufferance, and treated generally as if they were bound to break down again." Many failures in the reformation of women result

from the stigma thus attached to them. As a matter of fact "women who give themselves a fair chance have at least an equal chance with men of good result. I know of some women, now teetotallers after ten years and more, who have never broken down, and who were inebriates in every sense of the word, despite the illusory classification which has been attempted between inebriates and habitual drunkards." Thus does a great authority preach the gospel of hope to women who are the victims of alcoholic habits.

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**Work as a Cure for Inebriety.**

DR. BRANTHWAITE notes as one of the drawbacks in many of the retreats the impossibility of enforcing work on the patients. "There is no doubt whatever that a fair amount of regular labour is not only beneficial to the health of persons who are fitting themselves to resume their duties in life, but is also a most important recuperative factor in the production of good results." Under the Act of 1898 the Secretary of State has now the power to make regulations for the enforcement of such an amount of work as appears to be conducive to the health of the inmates of retreats, but the managers of homes which charge a fair price for the keep of inmates cannot, as a rule, insist upon the performance of manual labour, for fear of driving away patients from their institutions. Still, even in these every inducement is held out to patients to work, and to indulge in amusements and exercises which involve physical exertion.

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**Legal Compulsion advisable.**

IT is not to be supposed that many patients will enter retreats without the exercise of a good deal of pressure, which may in a number of instances almost amount to compulsion, exercised by their friends. Many cases may refuse altogether, or only consent when their powers of will are so impaired by their drunkenness that they are practically not free agents. There is much to be said for the suggestion made in the present report that it would be better to have legalised compulsion in fitting instances, a procedure similar to that for

detention of a lunatic being instituted. The friends of the inebriate should make a petition to a magistrate, supported by medical evidence, and if the subject of the petition be proved to be a confirmed inebriate, he should be compulsorily committed to a retreat. In the interests of the patients themselves as well as of their unfortunate relatives, it is to be hoped that some such enactment will before long be passed. It seems false sentiment to show exaggerated respect for the liberty of one who only uses it to his own destruction.

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**London Locomotion.**

THE recent appointment of a Royal Commission to consider the problems presented by the existing unsatisfactory state of London traffic, to which attention was forcibly drawn in the article by Dr. Louis Parkes in our last issue, seems to be a step in the right direction. It is only to be hoped that it may not turn out, as so many Royal Commissions have done, a means of shelving an awkward problem rather than of solving it. We may at least hope that travelling by "Tube" is not to be the locomotion for the Londoner of the immediate future. The difficulty of ventilating these deep-level lines seems very great; and, as Dr. Parkes pointed out, a generation which travels to and from business twice a day by "Tube," and sits in an office during the intervening period, will practically never get a breath of fresh air at all for a great part of the year. We cannot too frequently insist that it is not only in cases of tuberculosis that fresh air is necessary. All mankind need a plentiful supply of fresh, unbreathed air to keep them healthy; and underground travelling and living in close, ill-ventilated rooms are likely together to produce a race of delicate, neurotic, and degenerate specimens of humanity.

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**The Gelatine Treatment of Aneurysm.**

AN interesting paper appears in the recently published volume of *Guy's Hospital Reports* on this subject, being a thesis for the degree of M.D., by Dr. E. I. Claxton. The treatment of aneurysms by means of injections of gelatine was introduced practically by Lancereaux and Paulesco in the year

1897. The results claimed for the early cases of the method were very remarkable, and the total number thus treated must be altogether very large. Many fatalities have, however, occurred, the most notable of them being due to the appearance of tetanus as a sequel. This is attributed to the presence of the spores of this organism in commercial gelatine and the difficulty of rendering solutions of this substance absolutely sterile. That such difficulty should be experienced seems curious, in view of the common, not to say invariable, use of gelatine in the manufacture of nutrient media for the growth of bacteria in the laboratory. It is not, as far as we know, found that tetanus-bacilli develop with any frequency as contaminations of such cultures. That these spores may be difficult to kill by a single application of heat is easily admissible, but that they cannot be effectually removed by such a method as that discontinuous sterilisation is at least remarkable. Another objection to this mode of treatment of aneurysm is its extreme painfulness in many cases, so that patients practically refuse to go on with it after a few trials. In addition to these serious drawbacks, there appears to be considerable uncertainty whether any real increase does take place in the coagulability of the blood as a result of injections of gelatine. In the cases discussed by Dr. Claxton, it is not admitted that any real improvement took place in the aneurysms from which the patients suffered; and this writer concludes that the method should be discarded, since it is undeniably dangerous and of very doubtful efficacy.

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**Two Errors and an Apology.**

We have to offer our readers an apology for having by an oversight commented in our last number on an article by Dr. French, which we found ourselves at the last moment obliged by exigencies of space to hold over to the present issue. We must also cry "*peccavimus*" over a slip of the pen which led to an anatomical error on page 256. The little muscle whose tendon is liable to be mistaken for a nerve is, of course, the plantaris and not the popliteus.

# EVERYDAY AILMENTS AND THEIR TREATMENT.

## INDIGESTION.

WHEN a patient comes for treatment complaining of "indigestion," it is necessary to bear in mind that dyspepsia is only a symptom, and that it may be due to any one of a number of different causes. To the patient, indeed, it is a sufficiently definite "disease," and what has cured a neighbour of indigestion is confidently relied on to dispel his own ailment; hence the vogue of many a quack medicine. But the medical attendant knows better. He must seek for the cause of the condition in every individual patient, and adapt his remedies to the state of affairs which he finds.

## ACUTE INDIGESTION.

The simplest main division of the subject is that into acute and chronic form; and, fortunately or unfortunately, there is little difficulty in recognising an acute case of indigestion. Acute gastric catarrh is usually the result of some indiscretion in diet, either in the direction of mere excess of good things, or by consumption of some irritant substance, such as may lurk in tainted food. There is pain or intense discomfort in the region of the epigastrium, with nausea and often a condition approaching collapse. The pulse is frequent, the face usually pale, and the expression anxious. Often the patient wakes up in the night suffering from these symptoms, and sends urgently for the doctor. Under such circumstances Nature herself indicates, and often enough carries out, the proper treatment, viz., to empty the stomach as quickly as possible of the offending matter. Vomiting, if it have not occurred, must be induced, either by tickling the fauces with a feather or by passing the finger down the throat, or by the administration of large quantities of tepid water. Mustard and water may be used should these means fail. In giving emetics of all kinds it is well to bear in mind that the error

to be avoided is that of not giving enough rather than that of giving too much. A word of caution may be said on the use of apomorphine: it is a terribly depressing drug, and should be avoided except in cases of great urgency, such as those of actual poisoning. The possibility of such being the case must not be lost sight of in patients suffering from acute vomiting and gastric catarrh.

After the stomach has been emptied, two indications must be fulfilled—to soothe the irritated mucous membrane of the organ, and to expel any portion of the irritant matter which has passed into the duodenum. The latter object may be attained by the administration of a dose of calomel (3 or 4 grains), to be followed in the morning by a saline purgative, such as a seidlitz powder or some mineral water, such as Apenta or Rubinat: the former end is most easily gained by ordering abstention from all solid food for the next 12 hours, followed by a gradual return to ordinary diet. This may be aided by the use of a mixture containing bismuth and an alkali, such as:—Carbonate of Bismuth, 20 grains; Bicarbonate of Soda, 15 grains; dilute Hydrocyanic Acid, 2 minims, with Mucilage and Chloroform-water. If there is much collapse at first, a little alcohol in the form of brandy and water or, better perhaps, champagne may be given, but it should be borne in mind that alcohol is itself not infrequently the cause of acute gastric catarrh. Hot fomentations to the epigastrium may be comfortable to the patient, when vomiting has taken place; and sipping water as hot as can be swallowed may be soothing to the stomach in the absence of food.

## CHRONIC INDIGESTION.

A patient who complains of "indigestion" is one who suffers from the symptom in a sub-acute or chronic form, and the causes and varieties of this condition are legion. Failure in any of the functions of the stomach leads to digestive disturbance, and there are a number of cases in which it is difficult or impossible to discover any defect other than some nervous abnormality in dyspeptic individuals. It is to these that the term "nervous dyspepsia" is applied. Many forms of neuroses of the stomach are described and may possibly exist, such as pyloric spasm, gastro-spasm, pyloric insufficiency

and a dozen others, beside gastralgia or neuralgia of the stomach. Apart from pain, which may accompany any of them, they all reduce themselves to defects in the motility of the organ or in the secretion of pepsin or of hydrochloric acid.

*Defects in the motor power* of the stomach lead to retention of its contents within it, and the matters thus retained undergo fermentation or abnormal decomposition by the action of various microörganisms. Gases are given off in the process, and flatulence results; while toxic substances are formed, which are absorbed into the system and give rise to a train of symptoms, such as headache and general depression, which are seldom absent in chronic dyspeptics.

Common causes of a certain degree of gastric atony with resulting dilatation are worry over business and other affairs, overwork, and undue hurrying over meals. Naturally these causes are often combined. The chronic indigestion which ensues aggravates the causal condition, and a vicious circle is established. In such cases it is important for the patient to take at least a short period of rest after each meal, so that the digestive process may get a good start before work, either bodily or mental, is recommenced. It is well also not to take a meal directly after any hard bodily or mental work. Many of such patients do best if they make their chief meal in the middle of the day; but all are not alike in this respect, and individual idiosyncrasies must be taken into account. Meals should be small in quantity, and pastry and vegetables taken in only reduced amounts or not at all. A little light wine with meals is generally serviceable, such as a glass or two of good claret or burgundy; but any considerable quantity of liquid is to be avoided at meal-times, as it tends to dilute the gastric juice, and so to impair its action. Drink should be taken a couple of hours after eating, and a glass of hot water drunk the last thing at night is often beneficial.

Most of these patients tend to suffer from constipation, and attention must be paid to the bowels. Cascara sagrada or "Tamar Indien" lozenges are useful aperients in these cases. A bitter tonic before meals is often of use, such as:—Bicarbonate of Soda, 15 grains; Tincture of Nux Vomica, 5 minims; Spirit of Chloroform, 10 minims; and Compound Infusion of Gentian to 1 ounce: to be taken three times a day, 10 minutes

before food.[1] The majority of cases do best on an alkaline mixture, but some in whom flatulence is a pronounced feature derive more benefit from an acid tonic, such as :—Dilute Nitro-hydrochloric acid, 10 minims ; Spirit of Chloroform, 15 minims ; and Compound Infusion of Gentian to 1 ounce : to be taken half an hour after meals three times a day. Carminatives, such as ginger or peppermint, are also useful, the domestic remedy of a few drops of essence of peppermint on sugar or in a little hot water often giving relief.

A holiday and a change of air will often do more than any medicine in obstinate cases, and afterwards a course of iron in some form or other is generally needed. This may conveniently take the form of a pill consisting of :—Dried Sulphate of Iron, 1 or 2 grains ; Aloïn, $\frac{1}{6}$ grain ; Extract of Nux Vomica and Extract of Belladonna, of each $\frac{1}{8}$ grain : to be taken three times a day after food.

*Defect in the secreting power* of the stomach is usually the result of some degree of gastric catarrh, and perhaps the commonest cause of this condition is indulgence in alcohol. The familiar symptoms of nausea or vomiting in the morning, loss of appetite, especially for breakfast, looseness of the bowels, and a generally "good for nothing" feeling are suggestive of this cause. Still, the same condition may exist apart from alcoholism. Whatever be the cause, alcohol is best avoided in these cases. They are generally benefited by an alkaline mixture such as that given above (gentian and soda). The addition of a few drops of tincture of capsicum is of use in alcoholic gastritis. It is well to put these patients on a milk-diet at first, if the symptoms are at all severe, gradually resuming ordinary food. If raw milk be found to disagree it is advisable to give it mixed with soda-water or lime-water, and as a last resource it may be predigested (peptonised). Acid mixtures should be avoided in cases of gastric catarrh. The deficiency of gastric juice may be supplied if necessary by the administration of pepsin, a drachm of the glycerine of pepsin being given in an ounce of water after meals ; or the preparation known as lactopeptine may be employed. A

[1] Theoretically, the strychnine present should be precipitated by the alkali, and it is well to add a label, "Shake the bottle" ; but practically no precipitation occurs.

course of mineral water (Apenta, Rubinat, or Friedrichshall) taken before breakfast is useful, as tending to get rid of the products of perverted digestion; or other salines such as Carlsbad salts may take their place. Fluid magnesia is a serviceable remedy in many cases. With regard to the employment of pepsin or of predigested food, it may be remarked that it is better practice to encourage the stomach to perform its own work than to do the work for it outside the body; hence such remedial measures should be discontinued as soon as possible. Alkaline medicines given before meals tend to increase the flow of gastric juice, while acids diminish it.

In cases of *indigestion accompanied by excess of acid* the treatment must be the reverse of that employed when there is defect of secretion. An acid mixture may be given just before or just after meals, and, if necessary, an alkaline draught or powder some time later on, when the symptoms of acidity appear. These are mainly the onset of discomfort two or three hours after food is taken, along with eructations of strongly acid fluids into the mouth. A mixture consisting of Dilute Nitric Acid, 10 minims; Tincture of Nux Vomica, 5 minims; Tincture of Calumba, 20 minims; and Chloroform-water to an ounce may be prescribed, to be taken three times a day, directly after food; and Bismuth Lozenges (B.P.) may be given when the discomfort is noticed by the patient. If there is any tendency to diarrhœa, chalk should be used instead of bismuth; while constipation calls for the use of magnesia (calcined), which has laxative properties.

There is a class of cases in which there does not appear to be any appreciable amount of gastric catarrh, only an extraordinary degree of irritability of the stomach. These are characterised by the disproportionate severity of the pain complained of, as compared with the vomiting, wasting, and general symptoms of disease. The tongue may be red and irritable, rather than coated with fur, as in gastric catarrh. In these the use of the bromides is called for, 10 grains of bromide of sodium being added to a bismuth-mixture, with or without two minims of dilute hydrocyanic acid. If there is superacidity of the gastric juice, this must be treated on the lines just indicated. Hydrochlorate of cocaine is

sometimes useful in these patients, given in doses of one-fifth of a grain, to relieve pain and vomiting, for short periods only. Ten-drop doses of the liquor morphinæ are also of benefit.

In young women who are suffering from indigestion, often along with anæmia, it is difficult to exclude the existence of gastric ulcer; it is, therefore, best to err on the safe side and to treat these cases as if they had the graver disease. They should, therefore, be put at once on milk-diet, if there is any localised tenderness in the epigastrium with pain and vomiting after meals. A bismuth-mixture may be ordered, and rest enjoined. The pills of iron and aloïn, suggested on page 429, are often the best treatment when acute symptoms have subsided.

With regard to the diet which is most suitable to cases of indigestion, it is impossible to lay down hard-and-fast rules. The proverb that "one man's meat is another man's poison" is well illustrated in such cases. Dyspeptics vary much in respect of what they can and what they cannot take. In general, greasy and fatty food is to be avoided, such as buttered toast, fried fish, and all rich sauces and dressings. Most vegetables are to be taken sparingly, as tending to produce flatulence; and raw fruit is also to be avoided. Pastry is generally to be forbidden, but a small quantity of baked apple or stewed fruit may sometimes be permitted. New bread is inadvisable, and toast is perhaps the most suitable form in which bread can be taken. Boiled fish, chicken, and tender mutton are usually well borne, and custards and milky puddings may be permitted. It is important to remember that tender, well-cooked meat is quite a digestible substance, and not at once to condemn patients to "slop" diet. Lightly-boiled eggs are to be taken for breakfast, and sometimes bacon is found to agree. Cheese is, as a rule, to be carefully avoided, but some patients find that a little grated sound cheese is an acceptable change now and then, and does not produce any ill effects. Tea is a frequent cause of dyspepsia in those who take much of it, and it is well to forbid its use in most cases of indigestion. If it be allowed at all, it must be made weak, the infusion being poured off the leaves after it has stood not more than three minutes. It should not be taken along with any meat, and Chinese tea is preferable to that coming from Ceylon or India. Strong coffee is to be forbidden, and tobacco-smoking strictly regulated.

Finally, in a great number of cases indigestion is only a manifestation of a condition of general ill-health, and we have to see that our patients observe the ordinary rules of hygiene. Fresh air and exercise are two of the first requisites for the restoration of the perverted gastric function. It is not only tuberculosis that is to be combated by open-air treatment. A moderate amount of bodily exercise, not amounting to fatigue; a cold or tepid bath in the morning; open windows day and night—all these are means to restore and keep physical health, and they are essential to the dyspeptic. Sea-air and sea-bathing are often useful to put the patient on the road to recovery. Late rising is to be discouraged, and the old adage as to "early to bed and early to rise" is applicable to these patients. The effect of cheerful society, especially at meal-times, is very noticeable, and every effort should be made to keep the sufferers cheerful and prevent them from brooding over their real and imaginary troubles. Reading at meals is a bad habit. Personal peculiarities in the way of eating may need correction. Thus busy people find a great temptation to eat too fast and to bolt their food half masticated, a fertile cause of indigestion and gastric dilatation. The state of the teeth, too, must be carefully looked into: many a chronic dyspeptic has been more effectually treated by a new set of teeth than by any quantity of physic in a bottle.

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# THE LIGHT-TREATMENT IN LUPUS AND OTHER DISEASES OF THE SKIN.

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[With Plates XLIII.–XLV.]

The physical principles, on which Finsen's method of treating lupus and other diseases of the skin by means of the chemical rays of light is based, are summed up in the following propositions:—

1. Light acts as a stimulant of organic life. This fact has been demonstrated by Finsen himself and others by experiments on the movements of certain animals, and the stimulating property has been shown to reside chiefly in the actinic or chemical rays of light.

2. The chemical rays have the property of causing an inflammation of the skin. Bowles and other authors have shown that "erythema solare" is due to the action of the actinic rays, and Finsen's observations confirmed this statement. Charcot, Widmark, and others proved the same thing in regard to the dermatitis produced by electric-arc light (erythema electricum).

3. Light has bactericidal properties. This was proved experimentally by Downes and Blunt, Duclaux, D'Arsonval and Charrin, and others, and finally by Finsen, who showed that the bactericidal action increased in direct proportion to the degree of concentration of the rays.

4. Light can penetrate the skin. This is shown in "trans-illumination," and has been proved by Godneff by experiments on animals, and by Finsen for concentrated light.

5. Other facts bearing on the point are the effect of light on plants, the protective value of pigmentation in animals, and the exclusion of the chemical rays in the treatment of variola, revived and explained by Finsen in 1893.

*Lupus Vulgaris.* — Finsen's method has now become established as a recognised method of treatment for lupus in most of the medical centres of Europe. The most recent statistics of the Copenhagen Light Institute are as follows:— From November 1895 to January 1, 1902, the total number of cases of lupus vulgaris treated was 804. Of these 412 are reported cured, 124 had been free from recurrence for two to six years, and 288 for less than two years, 192 were nearly cured (only insignificant remains of the disease being left). There were still 117 under treatment: of these 91 were materially improved or partly healed, 26 more or less influenced by the treatment. Under the head of interrupted treatment (course not completed) are placed 83 cases. In 16 of these the treatment was discontinued because no satisfactory result was obtained; in 31 on account of the death of the patient: in 12 on account of serious intercurrent disease; in 23 on account of "other circumstances." Deducting the 67 cases in which treatment was interrupted by death, intercurrent illness or other circumstances, there remain 737 cases as a basis for the estimate of the result of the treatment. Of these the result is said to have been unfavourable in 42, and favourable in 695. The percentage of successes claimed by Finsen is therefore 94, while that of failures is only six.

Gaston, Baudoin, and Chatin (*Annales de Dermat. et de Syph.*, April, 1902) have reported 121 cases of cutaneous tuberculosis treated at the St. Louis Hospital in Paris. Of 30 cases of lupus in which the treatment was completed 11 were entirely and 12 partially cured: in 7 there was no result. Of 6 cases of tuberculosis cutis, only 1 was cured. Leredde and Pautrier (*ibid.*) reported 8 cases of lupus vulgaris completely cured and 7 almost cured out of a total of 43, the rest being still under treatment. Favourable results have also been reported by Sequeira, Gelbowsky, Ullmann, Forchhammer, Max Helm, Veljaminoff, von Ziemssen, Du Castel, Schmidt, Petersen, and others.[1]

*Lupus Erythematosus.*—Finsen treated 31 cases of lupus erythematosus, with 11 recoveries, 10 being still under treatment. Leredde and Pautrier treated 23 cases, 11 of which were entirely cured, 3 were improved: in 6 isolated patches

[1] *See* Will. S. Gottheil, "On the Practical Results of Actinotherapy," *Phil. Med. Jour.*, Jan. 10, 1903.

were cured, and in 3 there was complete failure. Favourable results have also been obtained by Gaston. Baudoin, and Chatin (10 cases with 3 complete and 7 partial recoveries), and by Helm, Veljaminoff, Leredde, and Sjögren. It would appear, therefore, that about one-third of all cases of lupus erythematosus are curable by the method.

*Alopecia Areata.*—Out of 29 cases of alopecia areata Finsen had 22 cases of recovery, 1 under treatment, and 6 in which treatment was stopped. Bang and Helm had good results, and Gottheil was successful in 1 case. Jersild treated 6 patients with no relapse.

*Carcinoma, Epithelioma, and Rodent Ulcer.*—Among 17 patients Finsen had 8 good and 2 fair results. Leredde reports a case of epithelioma, with 8 or 9 separate foci, cured in 2 months. Sjögren treated 10 cases of rodent and cancroid, 5 of which were cured. Cases have also been reported by von Ziemssen, Petersen, and Helm.

## COMPARISON OF RESULTS.

Our results, though not so brilliant as those claimed by Finsen, have been satisfactory in a considerable number of the cases of the lupus vulgaris treated by us. It is impossible, however, by mere statistics to give an adequate impression of the good effects of the treatment. Many of our cases have been of so severe a type that even the arrest of the progress of the disease has been looked upon as a favourable result. In most of the cases in which we can say that a complete cure has been effected, the affected area has been of small extent. The greater number of the more extensive cases are still under observation, and require a short course of treatment from time to time as recurrent nodules of the lupus make their appearance. It must not be forgotten that though the treatment is tedious in severe cases, the time expended is after all but a small proportion of the period during which the disease may last, if it is allowed to run its own course, or if it is treated by other methods. It is only those who are thoroughly cognisant of the extremely chronic course and intractable nature of the disease who can realise the beneficial effects of the light-treatment. When, however, sufficient time has elapsed for complete healing to take place in slight cases, and for definite improve-

ment with only an occasional relapse to be observed in more extensive cases, there is good reason to hope that the ultimate results will more than compensate for the time and labour expended in the treatment.

In order that good results may be obtained it is imperative that the patient be kept under observation for a long time. If this condition is not enforced, the disease may recur and much valuable time will be wasted. In none of the extensive cases under our care can we yet claim a complete cure. Relapses, however, are becoming fewer, and the interval between them far longer. Of 65 cases of *lupus vulgaris* treated by us 11 have remained without relapse for periods varying from six months to two years. In 10 of them, all favourable cases in which the disease was of small extent, we think ourselves justified in saying that recovery has been complete. In the eleventh, where the disease was more extensive, there has been no recurrence for a year. In 15 cases slight remnants of the disease remain or slight relapses have occurred from time to time, and the patients are still kept under observation. In 5 of these the affected surfaces were very extensive, in 5 of medium extent, in 4 of slight extent, and in 1—treated with X-rays only—the disease involved the mucous membranes of the upper lip and gums. Eight were discharged with no visible trace of disease, except in two cases, on the mucous membrane of the nose; they have not been seen since. Fifteen are still under treatment. Of 14 patients in whom the treatment was not completed, all who remained sufficiently long markedly improved. Four have almost recovered, while 4 did not have sufficient treatment for much good to be done. In 2 cases, in which ulceration was the marked feature, Finsen's light was useless. In both the ulcers healed rapidly under the application of the X-rays. In 1 the ulcerated part has, as far as we know, remainded soundly healed; in the second, healing took place, but relapse occurred, and the lesion was excised. In all the cases but one, disease of the mucous membranes, when present, was treated by means of X-rays, and in all, except one, in which there was no improvement, with good results.

Of 11 cases of *lupus erythematosus*, great improvement took place in 7; in one patient in whom the result was the most successful the disease relapsed as soon as the patient

ceased to attend. The other 6 patients have not been seen since they discontinued the treatment, but in none of them was the disease completely eradicated. In one patient no benefit resulted, and in another sufficient time was not given to the treatment. Two are still under treatment. All these cases were treated with Finsen's light; we have not treated any cases of this disease with X-rays.

Of 27 cases of *rodent ulcer*, we have had favourable results in 12. In most of these Finsen and X-ray treatment was combined. In most of them slight relapses have occurred, necessitating a second or a third course of treatment. Sufficient time has not yet elapsed to make it possible to say if recovery is likely to be permanent. Nine of the 27 cases were in the non-ulcerative stage, and the disease was of small extent. In one case, in which the upper and lower eyelids, the inner canthus, and the adjacent side of the nose were involved, improvement was very marked after many exposures to X-rays. A somewhat severe dermatitis followed, during which the deepest ulcer healed. This patient had undergone 8 surgical operations. There has been no recurrence of the disease for over a year, the last application having been made in January 1902. In 11 treatment was not completed: in 6 of these great improvement or apparent disappearance of the disease resulted at the time, but they have either not reported themselves since or have had treatment elsewhere. Of the other 5, 2 have been operated upon, 2 discontinued their attendance, and 1 patient, a very bad case, showed great improvement under X-ray treatment, but has since written to say that the disease has relapsed. Three are still under treatment.

In 2 cases of *alopecia*, 1 improved under Finsen's treatment, but the new hair fell out again, and treatment was discontinued; in the other there was no effect, but the patient only had a few exposures at rather long intervals. In the case of cheloid treated by us the result was unsatisfactory.

### LIGHT AND X-RAYS.

The employment of light and Roentgen rays as therapeutic agents has now to a large extent passed out of the experimental stage; and although we are far from knowing the

full range of their possibilities, their applicability and usefulness in certain conditions must be looked upon as fully established. The literature of the subject is fast becoming voluminous, and we hope by the comparison of our results with the work of others to help in the formation of a trustworthy induction from the facts which have been collected. These facts require to be carefully sifted, as the observations of workers do not altogether agree, either as to the methods of applying the light and the X-rays, or as to the indications for their therapeutic employment. On account of the loose way in which the terms "light" and "Finsen" treatment are used by many writers, it is necessary to state at the outset what these terms imply and to describe briefly the principal distinguishing features of the various methods of applying light for therapeutic purposes. In the first place the X-rays should not be included under the term light-treatment. They have nothing to do with light in the ordinary sense of the word. They are not on the visible spectrum and have not the physical properties of light such as refraction, polarization, reflection, &c. (the term "focus" applied to tubes is misleading. The X-rays cannot be focussed: the cathode-rays impinging on the anodal plate are deflected, not reflected, from it. The point we wish to emphasise is that, for purposes of description, their employment for therapeutic purposes should not be designated light-treatment, but X-ray treatment. The term "light-treatment" should be reserved for the use of the rays of ordinary spectroscopic light and the ultra-violet rays; indeed, for all practical purposes it may be restricted to the chemical or actinic rays, viz., the blue, visible violet, and ultra-violet rays, or, in other words, the therapeutically-active rays. The small proportion of yellow and green which may take part in the effect may be neglected. With the red and infra-red or heat-rays we are not concerned except in the matter of excluding them from acting upon the skin. The employment of incandescent lamps, often of different colours, in baths, is, as pointed out by Finsen, of but little value as regards the chemical activity of the light, and is simply a convenient means of applying heat in order to produce diaphoresis.[1]

[1] Finsen, "Neue Untersuchungen über die Einwirkung des Lichtes auf die Haut." (*Mittheilungen aus Finsen's Medicinischem Lysinstitut, Copenhagen*, 1899.)

### FINSEN'S AND OTHER LAMPS.

Another term which has come to be abused is that of "Finsen light." Although it is true that Finsen was the first to employ the chemical rays for therapeutic purposes on a large scale and thus any method may legitimately bear his name, it is better, in order to avoid confusion, to restrict the term to the particular way in which he applies the rays, which, as we shall see, is different from the other methods, viz., by concentrating or focussing them before they reach the skin. This process of concentration is the principle on which the original Finsen lamp is constructed, and in the newer small Finsen-Reyn lamp the same principle is adopted. According to Finsen, concentration is essential in order that the full effect — penetration and intensity — of the light may be obtained. In the French lamp of Lortet and Genoud, the divergent rays of the electric arc are not first made parallel and then convergent by a system of lenses, as in the Finsen apparatus, but the patient is brought close to the source of light just as they begin to diverge. There is, therefore, no focussing in this lamp, and consequently the intensity and penetration of the light are not so great. Only one layer of circulating water is interposed between the patient's skin and the source of light, so that the heat-rays are not so well eliminated and the effect is therefore more caustic and more of the nature of a burn, as well as more superficial, than that of the Finsen lamp. The various modifications of the French lamp, *e.g.*, that of Marshall and Woods, differ only in mechanical details, the principle of construction being the same. The area of skin treated with this lamp is much larger (four times) than that dealt with by the Finsen lamp, and the exposure is only 10 minutes or 15 minutes instead of the hour with the larger apparatus. The ampèrage is 10-15 instead of 60–80 (the new small Finsen lamp requires 15–20 ampères). The pressure is exerted by the patient himself, assisted, perhaps, by a nurse: there is no compressing-glass to be held or strapped on as in Finsen's method.

In our opinion the original Finsen lamp gives the best results on account of the greater intensity and penetrating power of the concentrated light. The French lamp is service-

able in very extensive cases, on account of the time saved, and in superficial cases we have used it as a preliminary to the employment of the Finsen lamp.

In order to avoid confusion we may say here that what we have called the new Finsen lamp consists of a short concentrating apparatus, the top lenses of which are cooled by means of water between and circulating round them, placed in front of an arc taking 15–20 ampères. It has the advantage of the French lamp in that one patient may be treated at a time and the apparatus is smaller and less costly than the large apparatus. It is the same in principle as the large pattern, the area treated being of the same size and the exposure one hour. A compressor strapped on or held by a nurse is used with this, as in the original lamp. The other lamps consist of devices for applying a large proportion of violet and especially ultra-violet rays to the skin, by means of water-cooled iron electrodes. This is Bang's lamp, of which the "Dermo" is a modification. In the Miller lamp iron electrodes are also used, and ice is employed to exert pressure on the skin. The exposure of these lamps is very short, and a severe superficial erythema is caused in a short time. The ultra-violet rays, however, are not concentrated, and the effect of these rays is too superficial to be of use in a deep-seated disease like lupus. It is probable that the visible violet and blue and possibly yellow rays are required.

Other means of applying light, such as reflected arc-light passed through blue glass and thrown upon the body of the patient like a search-light, do not concern us here, nor need we do more than refer to the high-frequency currents. In dermatological practice we believe that nothing can be done by the latter that cannot be more effectively compassed by the Finsen light and X-rays. Finsen's sun-treatment of lupus by means of large lenses containing a blue solution of copper-sulphate is impracticable in this country, and has been almost abandoned in Copenhagen on account of its obvious drawbacks and the greater efficiency of the electric light.

In previous papers we have referred to the advantages and disadvantages of the Finsen light-treatment, but it may be useful again to summarise them here, as well as the conditions which make a case favourable or the reverse for treatment.

### DISADVANTAGES OF THE TREATMENT.

The disadvantages of the treatment are the great length of time required—the patient must be kept under observation for one to three years; the tediousness of the treament for one hour daily and the loss of time which it involves; the occasional pain during the application; the inconvenience and pain caused by continual inflammatory reaction in parts treated; the expense of outlay and working.

### ADVANTAGES OF THE TREATMENT.

The advantages are the excellent cosmetic results; no bad scar or disfigurement results from the continual applications; no anæsthetic is required; no injurious effect is produced on the general health; the trustworthiness of the method—improvement may be expected in all cases, provided sufficient time is given to the treatment.

### UNFAVOURABLE CONDITIONS.

The following conditions are unfavourable for the treatment:—

1. Factors which hinder penetration of the light, and thus prevent a good reaction. Among these are pigmentation, dark complexion, and thick skin; great depth and infiltration of the disease; scarring from previous treatment; great vascularity of the parts.

2. Great extent of the disease.

3. Inaccessible position, *e.g.*, mucous membrane of the nose, &c.

4. Certain general factors not specially applying to the light-treatment. Among these are—

(*a*) Age. In general terms, the older the patient the worse the prognosis.

(*b*) Sex. Males, as a rule, cannot give up sufficient time to the treatment.

(*c*) Predisposition. A marked family history of tuberculosis is somewhat against the patient, as are other tubercular tendencies or manifestations in the patient himself.

(*d*) Occupation. Unhealthy surroundings or dirty occupations make septic infection probable and also reduce the vitality of the patient's tissues.

### REINFORCEMENT OF THE LIGHT-TREATMENT.

The light-treatment often requires to be reinforced in various ways. Thus in cases where the disease is very extensive or where there is much infiltration, scraping followed by X-rays may usefully be employed as a preliminary to the application of Finsen's method; or the X-rays alone may first be used and followed up by the Finsen treatment; or the French lamp may be employed to begin with, Finsen's method being used later. The X-rays may also be combined with Finsen's light-treatment. These methods may be further reinforced by the application of caustic remedies, such as pyrogallic acid or pyrogallic acid and salicylic acid followed by X-rays or Finsen. The same applications may be followed by X-rays or Finsen before healing has taken place. Weak ointments of the same caustics may also be used simultaneously with Finsen's method.

The following methods of reinforcement may be employed in slight cases, if refractory, or to get rid of remaining refractory nodules :—

| | |
|---|---|
| Pyrogallic acid - followed by Finsen<br>Acid nitrate of mercury, „ „ „<br>Silver nitrate - - „ „ „<br>Pure carbolic acid - „ „ „ | To remove horny layer. |
| Strong carbolic acid - - - -<br>Aniline oil - - - - -<br>Clove oil - - - - - | To make horny layer transparent. |
| Carbolic acid - - - -<br>Tincture of iodine - - - -<br>Permanganate of potash - - - | To increase reaction. (Macleod.) |

Treatment with X-rays appears to increase the reaction caused by the Finsen method when the latter is applied subsequently. In one of our cases in which a part of the face was treated by X-rays, subsequent treatment by Finsen's method caused reactions which took weeks, and even months to heal. On other parts treated continuously by Finsen's method this did not occur.

### THE QUESTION OF RELAPSE.

As we have before said, the cosmetic effects of the light treatment are its most valuable asset, and of greater

importance than its comparative painlessness, its reliability, or the permanence of its results. As regards the last point, the results are at first sight somewhat disappointing. Relapses frequently occur, and it is necessary to keep patients under observation for two, three, or more years, so that the recurrent nodules may be treated as soon as they appear. If this is not done, the disease may fall back to its original state. It is only in slight cases that we can so far claim to have had permanent results, taking two years without recurrence as a standard of permanence. Even in the most successful of the extensive cases, subsequent treatment has been required afterwards at intervals, although we hope the time will come when the disease will be entirely eradicated. It must, however, be borne in mind that many of these cases almost every known form of treatment has been tried, and no other method has given such satisfactory results as the light-treatment. Even in the worst cases the spread of the disease has been checked if sufficient time has been given to the treatment.

The illustrations refer to the following six cases, before and after treatment:—

*Case* i.—Woman aged 25. Lupus vulgaris.

*Family History.*—Five others in family, all healthy. No history of consumption.

*Personal History.*—She has always enjoyed the best of health.

*History of Present Condition.*—When she was three years of age she received an injury causing a slight wound which did not heal; from this the lupus developed. The patch was at first the size of a sixpenny piece and has gradually enlarged since.

*Present Condition.*—On the chin, a little to the left of the middle line, there is a more or less circular brown patch of lupus measuring one-and-a-half inches each way. The skin is diffusely infiltrated without any separate nodules or healthy tissue.

Treatment was begun on January 2, 1901, and each application was followed by a good reaction. The lesion being small, the treatment was not quite continuous, and a few days' interval were allowed when the part became sore and covered with crusts.

On February 19 the surface of the patch was paler, and no disease could be detected in the upper part.

On February 26 no nodules could be seen in the upper half of the diseased area, but there were a few in the lower part.

March 15.—Only one distinct nodule can be seen.

March 30.—Treatment was discontinued after 61 applications.

February 11.—The patch is pale and smooth and scarcely distinguishable from the surrounding skin.

March 1903.—No recurrence.

*Case* ii.—Girl, aged 13 years. Lupus vulgaris.

*Family History.* — Father and mother healthy, seven brothers and sisters also in good health. No consumption or skin-disease in the family.

*Personal History.*—Except for measles and whooping-cough she has never had any illness, and her general health has always been good.

*History of Present Condition.*—When she was seven years of age a small patch "like eczema" was noticed under her chin. This gradually became larger, but no particular notice was taken of it until the present year (1902), when the diagnosis of lupus was made. Beyond the use of ointments no treatment was adopted.

*Present Condition.*—There is a small patch of typical *lupus vulgaris* under the chin in the central line of the neck. It measures 2½ inches in length, and 2 inches in width. It is roughly circular in shape with an irregular margin, and consists of large scaly lesions of a comparatively dark-brown colour with occasional small areas of intervening healthy skin. There is also a small patch on the right buttock.

Finsen treatment was commenced on May 16, and continued until September 11, 1902. Fifty-nine applications were given altogether, nine of them with the Marshall and Woods lamp.

On December 23 no disease could be detected, and a smooth pale area, scarcely recognisable as scar-tissue, remained. There has been no recurrence up to the present time.

## Plate XLIII.

*Case* i.

*Case* i.

*Case* ii.

*Case* ii.

*Case* iii.—Girl, aged 13 years. Lupus vulgaris.

*Family History.*—Father and mother and three brothers healthy.

*Personal History.*—Apart from her skin-disease, she has always been in good health.

*History of Present Condition.*— The disease was first noticed on the hand, when she was seven years of age (six years ago). She does not remember when it first came on the face, but thinks it was about the size of a sixpenny-piece when she was ten years old. It has been spreading rapidly of late, and is now "twice as large as it was last year." The patch on the hand has not increased in size for some time.

The disease has been scraped 18 times, at intervals of about a month, the hand being scraped at the same time as the face. It was also "burnt" at a London Hospital three years ago.

*Present Condition.*—There is a large patch of thick nodular lupus occupying the greater part of the left side of the face. Above, it extends from the external canthus to the lobe of the ear; behind, to the line of insertion of the ear; and below, to the angle of the jaw, from which point the margin curves round on to the cheek, passing the angle of the mouth to reach a point about 1 inch from the ala of the nose. From this point the upper limit passes backwards to the ear. There is also a patch of lupus on the dorsum of the right hand, involving the cleft between the first and second fingers and extending posteriorly to the base of the metacarpal bone of the first finger. It is about 2⅛ inches long and 1¼ inch wide. The patch is thick, warty, and fissured.

Treatment was begun on April 15, 1901, with one, and sometimes two hours daily of the Finsen light. On May 10 she contracted diphtheria and the treatment was interrupted. She returned on June 28, and from that date until January 1903 she has had almost continuous daily treatment. The improvement has been very slow owing to the great thickness of the lupoid infiltration, and pyrogallic-acid ointment has been used frequently. The disease has now been reduced to a few nodules at the periphery of the patch, the central part presenting a smooth flat scar.

She is now having intermittent treatment, both with the Finsen and Marshall and Wood's lamps. The patch on the hand was also treated with X-rays, but proved refractory to these as well as to the Finsen rays.

The application of a pyrogallic and salicylic-acid ointment has given fairly good results, but even now the disease on this part has a tendency to spread at the edges. It is possible that in this as in another of our cases, a preliminary scraping would have diminished the duration of the treatment.

*Case* iv.—Woman, aged 30 years. Lupus vulgaris.

*Family History.*—Father and mother in good health, also one brother and four sisters. No consumption in the present generation.

*Personal History.*—She has always been "delicate." She had an attack of pleurisy three years ago.

*History of Present Condition.*—The disease began 20 years ago close to the right ear. She first noticed a "lump which burst and formed a sore." She was treated at a hospital with lotions and ointments, but has had no operative treatment. The disease has a tendency to heal and has been much better of late years.

*Present Condition.*—The patient looks weakly and emaciated and is of a sallow dark complexion. The right cheek and side of the neck are extensively scarred, and the lower part of the ear of the same side has been destroyed. In the scar and at its periphery are red, slightly raised, diseased patches, and discrete brown nodules are sparsely scattered throughout the scar. The cicatricial tissue is fine, fairly smooth, and comparatively healthy, approximating to the scrofulodermic type in appearance.

Treatment was commenced on September 5, 1901, the light being applied for one hour daily. There is nothing special to record except gradual and progressive improvement, reactions following each application in the usual way.

After three weeks' interval without treatment at the end of December, the improvement was very manifest, but three diseased foci still remained in the form of yellowish infiltrations, two situated near the ear and one on the ear. Otherwise the scar looked pale, smooth, and healthy.

PLATE XLIV.

*Case* iii.

*Case* iii.

*Case* iv.

*Case* iv.

Regular treatment was discontinued on January 22, 1902, and she only had two more applications after this date. On April 25th it was noted that the disease had entirely disappeared except for a suspicious spot close to, and in front of, the ear, and a small lesion on the ear itself. Otherwise the scar was apparently quite healthy, and presented a white smooth surface with one or two pigmented spots here and there.

The patient was discharged on April 28, 1902, after having had 84 applications. There was no recurrence in February, 1903.

*Case* v.—Woman, aged 36. Lupus vulgaris.

*Family History.*—Nothing of special medical interest. No known consumption in the family.

*Personal History.*—General health fairly good; but the patient has always been "delicate and nervous."

*History of Present Condition.*—The lupus was first noticed, a small spot on the left side of the lip, when she was 30 years of age. It was left without treatment for 18 months. Two years after it is said to have made its appearance on the nose, at first inside and then outside. She had homœopathic treatment four years ago, and after this the diseased part was "punctured" under an anæsthetic. Improvement resulted for a time and no further treatment was adopted for a year. Three years ago the affected area was scraped at a London Hospital, but the improvement was only temporary. Cauterisation was then tried, but in spite of this the lupus spread rapidly and involved the right cheek as well as the nose. Soon after the left side of the face became affected.

*Present Condition.*—The disease affects nearly the whole of the skin of the nose except a small portion at the upper part on the left side. On the right cheek just below the eye there is a patch about the size of half-a-crown, reaching outwardly as far as the line of the outer canthus and sending a process up to the inner canthus. This patch is continuous with the disease on the nose. On the left cheek there is a raised scaly patch, and there is another left on the left side of the upper lip. In parts, especially on the left cheek near the nose, there is some scar-tissue. The mucous membrane of the nose is only slightly affected and gives no trouble. The lesions are not

ulcerated, but are raised and nodular and covered with scales. The main patch on the nose is composed of a continuous sheet of lupus without any intervening healthy skin.

The treatment was begun on February 27, 1901. There were good reactions, and improvement was steady. By the end of April considerable progress had been made, and on May 29 the diseased surfaces were flatter and less hypertrophic. She improved steadily, and at the beginning of September, after a rest of three weeks, the skin on the left cheek and on the nose was pale, smooth, and soft, and to all appearance normal. A few nodules could be seen in the scar, if carefully looked for. The original scar-tissue was also softer. On the right cheek, where the disease was more active, a little redness of the skin remained, but the improvement was also very marked.

In January 1903 a lupus nodule could be detected here and there in a smooth but slightly reddened scar.

In March 1903 no definite nodules could be seen, but it was thought advisable to make a few further applications to one or two doubtful spots.

*Case* vi.—Woman, aged 44. Rodent ulcer.

*Family History.*—Mother died of "cancer of throat." Father alive and healthy.

*Personal History.*—Very good; never laid up with any serious illness.

*History of Present Condition.*—The disease began 18 years ago as a "small pimple" on the right cheek near the corner of the mouth. It remained in this condition until about five years ago, when it "broke out all of a sudden" and began to spread rapidly. It was treated with ointment at a London Hospital, and improved for a time, but never quite healed. Three years after she again went to the same hospital, where it was burnt with nitric acid on and off (once a month) for two years. This treatment served to keep it within bounds, although at one time it became very much worse.

In the spring of 1902 the use of X-rays was advised, and for two months (February and March) she had exposures lasting about 20 minutes, twice or three times a week, but only had 10 or 12 applications altogether. Under this treatment the part inside the mouth improved, but not the outside.

## Plate XLV.

*Case* v.

*Case* v.

*Case* vi.

*Case* vi.

*Present Condition.*—The condition of affairs is well shown in the photograph. There was a slightly red, scarred area on the right cheek, which measured 1½-in. vertically and 1-in. transversely. At the part immediately adjoining and involving the angle of the mouth there was a deep ulcer, with somewhat irregular edges, ¾-in. in length and ¼-in. in width. The floor of this ulcer was covered by a thick yellow crust. The mucous membrane at the angle of the mouth was also implicated. At the anterior and lower edge, below the ulcerated portion, the scar ended in a hard raised border, with a shining flattened top, characteristic of the edge of a rodent ulcer. In the other parts the scar was flat and smooth, and merged into the surrounding skin without any line of demarcation.

X-ray treatment was begun on September 24, 1902. Improvement began after three or four applications of ten minutes' duration. On October 1 the ulcer was clean, and beginning to granulate, and the discharge had lessened.

On October 4 the soft part was less stiff and painful, and the patient could open and close her mouth without difficulty. *Healing* was progressing rapidly.

By October 10 healing had well advanced, the ulcer being diminished in size by half, and its outer edge bordered by a heaped-up ridge of granulation-tissue.

On October 18 only a very small ulcer remained, and by October 28 it was completely covered by epidermis, leaving a smooth, healthy-looking scar.

November 12.—Although all the ulceration had healed, the narrow raised edge, about ½-inch in length at the lower and inner border of the scar, showed no signs of yielding to the treatment, and it was thought advisable to try to remove it with Finsen's light.

November 22.—Had three consecutive applications of the Finsen rays a week ago, and a small crust remains from the effect of this.

On November 28.—The crust has separated, but a trace of the raised edge still persists. Three more applications of the Finsen light were ordered.

On December 19.—No trace of disease could be detected, and the part presented a flat smooth scar. The patient had altogether forty applications of the X-rays and six of the Finsen light. She was discharged, but told to report herself in a few weeks.

# UNDULANT FEVER.

By Surgeon F. J. A. DALTON, *Royal Navy.*

[With Charts A—D.]

## DEFINITION.

A PYREXIAL disease, endemic in certain localities, having a long and indefinite duration, with a tendency to undulatory waves of temperature.

A very large number of names have been applied to this disease. Thus it has been called Mediterranean, Malta, Rock, Cyprus, Neapolitan, Cretan, &c., Fever, from its geographical distribution: Intermittent Typhoid, Recurrent Typhoid, Typho-Malarial, &c., from its resemblance to Typhoid Fever: Gastric Remittent, Bilious Remittent, or Simple Remittent Fever, from its remittent character: and Simple Continued Fever, from its lengthened course and want of definite symptoms.

## HISTORY.

There is very little doubt that Hippocrates in his *Epidemics*, about B.C. 450, describes this disease. The next accounts of the fever that are in any way reliable are due to French military surgeons during the French occupatiom of Malta (1798–1800). During the early part of the 19th century we get numerous accounts of this fever by naval and military surgeons serving in the Mediterranean, which are chiefly of interest in showing the extreme difficulties they experienced in classifying the fever they met with. In the writings of Sir Wm. Burnett (1810), Hennen (1818), Davy (1842), Marston (1860), and Notter (1876), this fever is undoubtedly recognised and described; but it is not until 1879, when Veale published a paper in the *Army Medical Report*, that we get any stress laid on the fact of this being a separate disease, *sui generis*. From 1879 to 1889 nothing of importance was published about this disease, but in the latter year Bruce published an account in the *British Medical Journal* which at once brought the disease out of the general confusion surrounding febrile conditions

occurring in the Mediterranean, and established it as a separate specific disease.

### GEOGRAPHICAL DISTRIBUTION.

The chief objection to the names Mediterranean or Malta fever for this disease, the terms by which it is generally known, is that it undoubtedly occurs in many other places besides Malta and the Mediterranean ports. It is certainly endemic in Malta, Gibraltar, Crete, and Cyprus; probably also in Italy (southern portion), Greece, Turkey, and Sicily. There is now very good evidence that it occurs also in India, North and South Africa, South America, Straits' Settlements, and China. I have no doubt that, when this disease is more generally understood, it will prove to have a very wide distribution, as I have been shown cases of so-called typho-malarial fever in the Straits' Settlements, Borneo, and China, which, with my present knowledge of the disease, I should have no hesitation in calling undulant fever.

### ÆTIOLOGY.

The discovery by Bruce in 1886 of the *Micrococcus melitensis* in the spleen of cases suffering from this disease finally established its causal agent. How this organism enters and leaves the human body, and what its habitat outside the human body may be, are up to the present unsettled points.

The following are the principal theories with regard to its causation :—

(1) The popular theory of the causation of undulant fever in Malta (where, it may be mentioned, practically all the research-work on this subject has been done) is that it is caused by the insanitary condition of tideless harbours of that island.

(2) Hughes, in his book on this fever, inclines very strongly to the theory that the disease is caused by an aërial fæcal poison.

(3) The latest and, at the present time, most popular theory, at any rate in Malta, is that it is caused by the bite of some infected insect, such as the mosquito or sandfly, in exactly the same way as malaria is.

From the evidence which I have been able to collect during the past three years from naval, military, and civilian sources in Malta, there are insuperable difficulties to the acceptation of any of these theories. The matter is still unsettled, but from the work on this subject that has been done up to the present I have come to the following conclusions :—

(1) That the disease is air-borne.

(2) That it is a very widely-diffused organism in the localities where the fever is endemic, *e.g.*, Malta. This conclusion is drawn from the fact that it occurs practically all over the island, attacking people living under totally different sanitary and social conditions.

(3) That it has to be taken into the healthy individual in a large dose to produce its characteristic effects.

By this is meant that, in all probability, the dwellers in an area where this fever is endemic inspire in the air which they breathe a certain number of the organisms producing the disease, and that the natural bactericidal power of their blood is sufficient to destroy the organisms thus taken into the system; but that, granted (1) a lowered bactericidal power from any cause, such as excessive fatigue, chill, the effects of some other illness, noticeably influenza and pneumonia, &c.; or (2) that the organisms are taken into the system in sufficient quantities and for a sufficient length of time to overcome the natural bactericidal powers of the blood, then the organism gets the upper hand and finds its way to the spleen, and there is as much difficulty in dislodging it as it found in arriving at its suitable nidus.

There are many facts that point to the probability of this theory being correct. The fact that the Maltese population (still taking Malta as our example) suffers in much smaller proportion than the European points to their having a much stronger bactericidal power towards this organism, partly hereditary and partly acquired—the latter being probably due to the fact that from earliest childhood they have been taking small doses of this organism into their systems, and so increasing their bactericidal power towards it. It is also a fact that individuals recently arrived in an endemic area are more liable to contract the disease than people who have resided

there for some time, showing that a partial immunity is acquired by length of residence in the infected area.

*Age.*—Children under four years of age and old people are seldom attacked, but persons of all other ages seem equally prone to attack.

*Season.*—The fever is usually most prevalent in the months of May, June, July, and August, the period of lowest rainfall, and—what I would lay stress on—a period of great variability in direction of wind, with consequent dust-storms.

*Incubation-period.*—The exact incubation-period of a disease usually starting with very indefinite symptoms is difficult to settle, but the evidence collected on this subject points to the fact that from 10 to 16 days is the usual incubation-period. In the cases of accidental inoculation with the M. melitensis, of which several have now occurred, the incubation-period has varied from 5 to 15 days. The question of "latency" has not yet been worked out, but I have recently obtained the histories of quite a large number of cases in which the disease has apparently remained latent in the system for considerable periods before producing its symptoms. Men who have never had a day's fever while serving two or three years in the Mediterranean have developed the disease for the first time after their return to England.

*Not infectious.*—In spite of the popularity of the recent "mosquito theory" of its origin, I am convinced that under ordinary circumstances it is not directly communicable from the sick to the healthy.

*Immunity.*—One attack usually confers immunity, just as is the case with most specific diseases. There has been much controversy on this subject, but the evidence obtainable, since more accurate diagnosis has been established, practically puts this fact beyond any doubt.

## PATHOLOGY AND MORBID ANATOMY.

The opportunities for working out the pathology of this disease, in spite of its frequency in the endemic areas, are very few. This is owing, partly, to the fact of its very low mortality, and partly, to the fact that in Roman Catholic countries it is very unusual to obtain permission for a post-

mortem examination. In the cases that die during an acute attack of fever, the only morbid changes noticed have been confined to the following organs :—

*Heart.* — Very pale and flabby; the walls thinned and showing marked degeneration of the muscle-fibre; no endocarditis or pericarditis. In some cases the heart-walls become so thinned as to be almost transparent when held up to the light.

*Lungs.*—Usually a little passive congestion of the bases, secondary to a failing heart.

*Liver.* — Congested and increased in weight. Average weight, 59 ozs.

*Spleen.* — Much enlarged, very soft; in some cases the spleen-pulp is quite diffluent, running out like semi-fluid blood when the capsule is cut into. The capsule of the spleen is thickened and tough. Average weight, 19 ozs.

*Brain.*—Usually congested, with slight increase of fluid in ventricles, but often quite normal in appearance.

*Kidneys.*—Sometimes slightly congested, but usually normal in appearance and weight.

*The Alimentary Canal* has always been found quite normal, from mouth to anus, in the cases which I have examined.

In cases which die late in the disease, usually from heart-failure or with intercurrent disease, there are the signs of long-continued toxic irritation of the tissues. The liver and spleen, but especially the latter, are both enlarged, but firm to the touch and with excess of fibrous tissue in them. The heart is usually very pale with thin walls and often dilatation of the cavities.

*Microscopic Changes.*—The only changes that have been observed microscopically, apart from those produced by long-continued toxic irritation of the tissues, have been in the spleen, liver, and kidneys. Sections of the spleen show an increase in the lymphoid tissue, with enormous numbers of single micrococci scattered throughout the section. The liver-cells are found to be in a condition of cloudy swelling, and show granular degeneration of their protoplasm. The kidneys show the same changes of granular degeneration in the glomeruli.

BACTERIOLOGY.

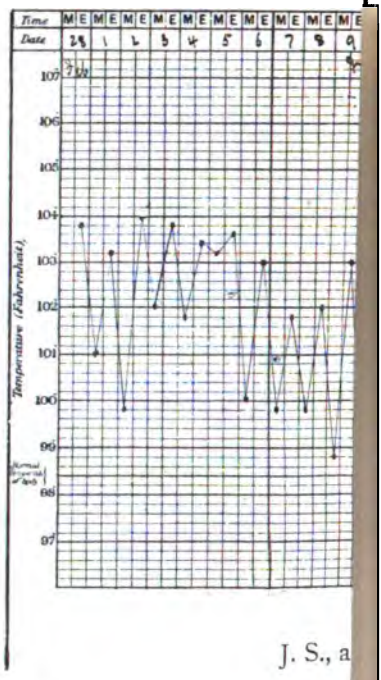
The Micrococcus melitensis is a minute, oval coccus, occurring generally singly, sometimes in pairs, but never forming chains. It measures about ·33 millimeter in diameter (Bruce), and when examined in the hanging drop shows rapid movement. Gordon states that it is provided with from one to four flagella, and the character of its circular movement in the hanging drop certainly suggests the possession of flagella. It stains well with the more powerful of the aniline dyes, but very rapidly loses its stain. It does not stain with Gram's method.

*Growth-Characteristics.* — It is a very slowly-growing organism, usually taking four days to make its appearance on suitable media. The degree of alkalinity of the media employed is a matter of great importance to this organism. It grows best on gelatine-agar, or in bouillon of an alkalinity of — 10 (Eyre's method); it can be educated to grow on media of a greater alkalinity, on neutral media, and even on faintly-acid media, but the growths are feeble and take many days to appear. Many disappointments will be met with in working with this organism, if this extreme susceptibility to the reaction of media is not constantly borne in mind. The shortest time in which the writer has been able to obtain a growth was 46 hours, on agar of a very suitable alkalinity inoculated direct from the spleen.

In liquid media slight turbidity shows about the fourth day, the medium never becoming more than slightly opaque, as the growth settles to the bottom of the tube in a thin, flaky deposit. No pellicle is formed.

On solid media the colonies appear as minute, circular, clear growths, like little drops of sweat coming out on the surface of the medium; in four to five days these drops assume a pale-amber colour, and later on become somewhat opaque, though even in quite old growths there is still a considerable amount of translucency. No liquefaction of media or formation of gas occurs.

The optimum temperature for this organism is 37° C. to 38° C., but it will grow well at any temperature between 20° C. and 40° C. This micrococcus will retain its vitality after a considerable amount of drying.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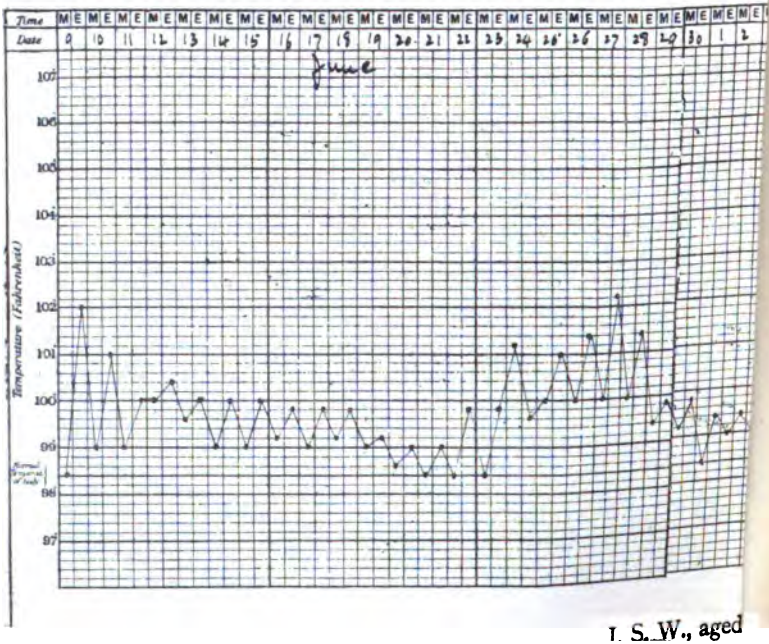
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## SYMPTOMS.

Undulant fever is a disease remarkable for the fewness of its symptoms, a large proportion of the cases having practically no symptoms beyond the raised temperature, so that the question of pyrexia in this fever will be dealt with first.

*Pyrexia.*—The most noticeable points about the temperature-charts of these cases are their extreme length, the variety of types they assume, and the tendency underlying the various types to produce undulatory waves of fever. The duration of the pyrexia, and the various types which the chart may assume during the course of an attack, are both quite indefinite, and appear to follow no rule that can be made applicable to even a majority of these cases.

The remittent type of chart is by far the commonest, but there may be a continuously high run of fever, or a long-continued low pyrexia; there may be remissions or there may be none; and the type of pyrexia may vary during the course of the attack, so that all three of these types may be produced in different parts of the same chart.

A glance at the accompanying charts, which are selected from many hundreds of cases, will show, much more clearly than any written description, what is meant by the different types of pyrexia met with in this disease.

The Chart A. is typical of the remittent type of fever. This type of the disease usually lasts a very long time, and is accompanied by the more severe forms of neuritis; the sweating during the night is excessive, but the patient feels comparatively well all day and takes food well.

The Chart B. is typical of the continuously-low form of pyrexia. Those cases seem quite unaffected by treatment, do not, as a rule, suffer from neuritis, keep up their weight if generously fed, but seldom get rid of their disease without change of climate.

The Chart C. illustrates a case, starting with a continuously-high form of pyrexia, lasting for nearly three weeks, and then taking on the remittent type. It is in this type of the disease that it is almost impossible, at any rate at the commencement of the illness, to make a diagnosis between undulant and enteric fevers without an examination of the serum for Widal's reaction. These are the cases which have diarrhœa, distended

abdomen, enlarged liver and spleen, with foul tongue a delirium. The enteric spots are of no value as a diagnost help, as many cases of enteric, in tropical and sub-tropic climates, have no spots, and many cases of undulant fever ha spots, which may easily be mistaken for enteric spots, bo by their appearance and the fact of fresh ones appearing d after day.

The Chart D. illustrates in a very marked manner the wav of pyrexia from which this disease derives its name. It is n very common to have such definitely marked waves, but th undulant character will be found in every type of the pyre of this disease.

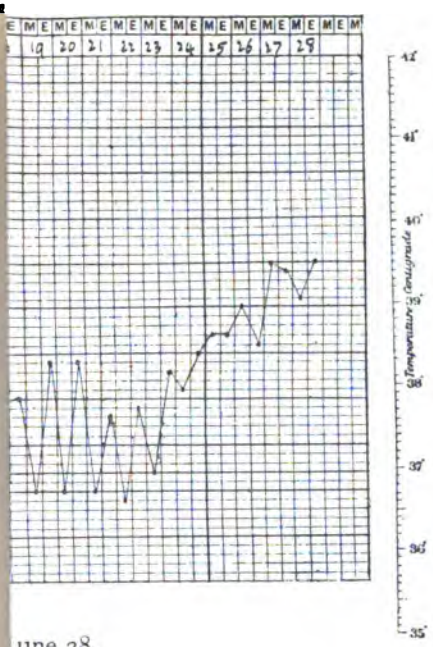
*Alimentary System.*—The fauces and tonsils always sho signs of more or less congestion, or even inflammation, in th first few days of the illness, with occasional enlargement an tenderness of cervical glands.

The tongue is furred; in acute cases a thick, dirty fur covering the whole tongue, in mild cases a light fur on the posterior half of tongue, with the edges and anterior portion moist and clean. The tongue may be denuded of its surface-epithelium in the acuter cases, and assume the glazed, "raw-ham" appearance. In the later stages of all types of cases, provided they are under appropriate treatment, the tongue gets an appearance which is very typical of this disease; the whole tongue slightly enlarged and flabby, with tip, edges, and anterior portion moist and clean, but posterior portion lightly furred and moist, with transverse striation. These transverse striæ sometimes go quite deep into the surface-epithelium and look like cracks. There is often slight epigastric tenderness during the first few days of fever, but very rarely any vomiting.

Constipation is the general rule in this fever, though during high waves of temperature it is not uncommon to get diarrhœa, with loose, yellow motions.

The appetite is poor for the first few days, until the intestinal tract has been cleansed with purgatives and intestinal antiseptics; after that it is remarkably good, patients suffering from this disease being able to digest solid food extremely well, even when their temperatures are running fairly high.

The liver and spleen are both always enlarged, especially

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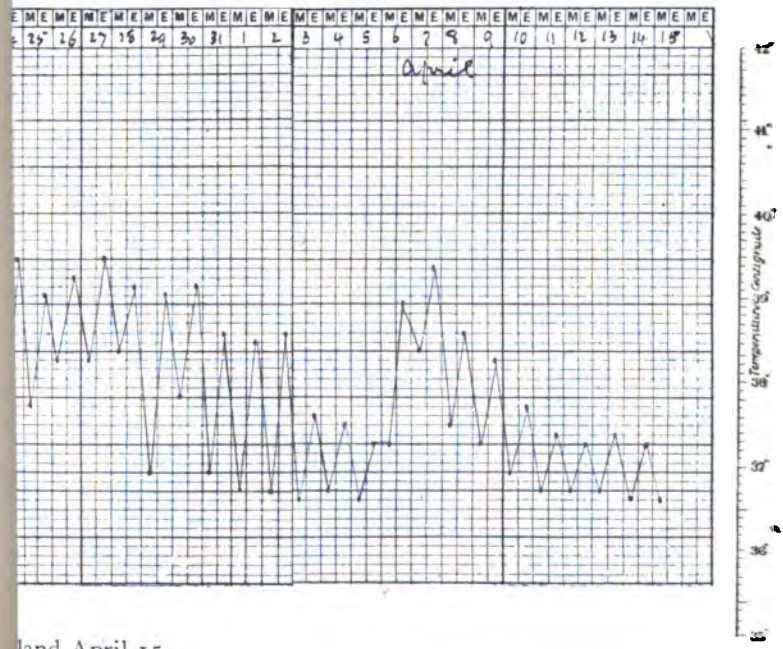


land April 15.

the spleen. During the height of a wave of fever the spleen is tender, enlarged, and very soft, hardening again as the temperature comes down.

Epistaxis is by no means uncommon in this disease, occurring in 6 per cent. of my cases. It nearly always comes on at the height of a wave of fever, and is severe as a rule; the temperature usually goes steadily down after its occurrence.

*Tegumentary System.*—Sweating is usually profuse, especially in cases with the Remittent type of chart. At the height of a wave the skin remains hot and dry, but when the temperature is falling, the patient is bathed in perspiration every night. The hair gets dry and brittle, and frequently falls out to a great extent. In cases of long illness the nails also get brittle and break easily.

The profound anæmia of these long cases of undulant fever, though always described, is very rarely seen in patients who have been kept throughout on a generous diet. In the same way, subcutaneous hæmorrhages, or purpura, though apparently extremely common two or three years ago, are now scarcely ever seen.

*Nervous System.*—Next to the pyrexia, the writer would place affections of the nervous system as the most common symptom of this disease, a neuritis, more or less severe, occurring in quite half the cases. The nerves especially affected are the sciatic, circumflex, and peroneal nerves, named in the order of frequency, although almost any nerve may be attacked. This neuritis comes on quite suddenly, and is usually acutely painful, preventing any voluntary movement of the affected limb, and causing pressure along the course of the affected nerve to be almost unbearable. The acuteness of the symptoms passes off in 24 or 48 hours, but a subacute neuritis of the nerve is usually left, which may continue, varying in severity from day to day, but often lasting with remissions throughout the course of the fever, and sometimes for many months after the fever has quite subsided.

There is no doubt that the products of this micrococcus seem to have a special and selective action on the central, and especially the peripheral, nerve-tissues, and also probably on the fibrous sheaths of nerves. The localised and metastatic

nature of the affection, the fact that the condition often persists for months after the subsidence of the fever, and the severity of the pains at the back of the neck, in the lumbar region, and at the backs of the eyeballs, along with the mental irritability and wakefulness, all point to this virus having a special action on the cerebro-spinal system.

In severe cases with high temperature an active form of delirium is usually present, and at the end of a long attack of fever there is considerable nervous prostration with impairment of mental capacity. Irritability of the nervous system is also shown by an increase in the reflexes and cutaneous hyperæsthesia over certain spots supplied by specially affected nerves.

*Arthritic Symptoms.*—The importance and frequency of the neuritis has not been sufficiently noted in the literature of this disease, whereas on the other hand much is written about the frequency of arthritic symptoms, Hughes stating that effusion into joints occurs in 40 per cent. of the cases.

In my experience, effusion into joints is extremely rare. It is common to hear that a patient with this fever is "crippled with rheumatism"; but on examination of the case it almost invariably turns out that the patient is crippled with neuritis, there being no effusion into the suspected joint or joints. Effusion into joints, however, does occur; in my experience in under one per cent. of the total cases. It usually takes the form of a chronic or subacute effusion, which lasts a considerable time before absorption takes place, and is quite unaffected by the administration of salicylates. The knee is the joint most commonly affected. A passive effusion also occasionally occurs into tendon-sheaths, the extensor tendons at the wrist and the tendo Achillis being the ones which I have seen affected.

*Circulatory System.*— The only special point about the circulatory system in this fever is that the nerves of the heart are affected in the general nerve-disturbance, causing an increased rate of heart's action, not at all in proportion to the degree of fever. Palpitation from the most trivial causes is also common. A patient, who by his temperature-chart appears to be having a comparatively mild attack of fever, may really be in much greater danger from heart-failure than a case with severe symptoms and high fever. The

implication of the nervous vasomotor system in this disease must always be kept in mind in the treatment of these cases. The few deaths that I have seen from this disease have all been caused directly by heart-failure, and at the post-mortem examinations the muscle-fibre of the heart has been found thin, pale, greasy, and acutely degenerated.

*Urinary and Sexual Systems.*—The urine is usually normal, except during periods of high fever, when a trace of albumen may be present. The fact of retention of urine being likely to occur in acute cases must always be kept in mind.

Epididymitis and orchitis are fairly common complications in this disease: they are not usually of a very acute or painful type, and soon subside with rest and warmth.

### COMPLICATIONS.

*Hyperpyrexia* may occur; it is usually easily controlled by ice-packing, but cases sometimes very stubbornly resist any form of external application of cold as well as antipyretic drugs. The best guard against getting hyperpyrexia is to have a routine rule for external application of cold whenever the temperature goes above 103·6°.

*Cardiac failure* is the great complication to be guarded against. It must be remembered that we are dealing with a fever of very long duration; and not only that, but a fever in which the nervous apparatus of the heart is often seriously involved; and our treatment must be directed towards keeping the heart-muscle in as good condition as possible for the long-continued extra work that is thrown on it.

*Pulmonary congestion* often occurs, but is secondary to a failing heart. *Pleuritic* and *pericardial effusions* are said to occur, but I have never met with them.

### DIAGNOSIS.

The diagnosis of undulant fever in its early stages, where Widal's test is not available, is an extremely difficult matter. This is owing to the fact that it commences in so many different ways; in some cases there is continuous high fever (averaging 104°), with intense headache, diarrhœa, distended abdomen, and enlarged spleen, the aspect of the case, in fact, simulating enteric fever in all its signs and symptoms; in others there is a continuously low temperature, varying from

99° to 100° F., often never going above 101°, with practically no other symptoms; in others, again, a high temperature, for two or three days 103° to 105°, with congested tonsils and fauces, furred tongue and headache, the temperature dropping to 99° or 100° at the end of three or four days and continuing indefinitely at that range. In its early stages this fever may be mistaken for almost any disease that commences with raised temperature and general malaise; those with which it is most usually confounded being enteric fever, rheumatism, acute tonsilitis, acute tuberculosis, and what, for the want of a more accurate term, is known as simple continued fever, or simple febricula. It is a matter of frequent occurrence to get cases sent into hospital as undulant fever, which turn out to be tuberculosis, subacute rheumatism, deep-seated abscess, malaria, or secondary syphilis.

Latterly the serum-test for this fever has been much more widely used in the endemic areas, with the result that there is some accuracy about the statistical returns of the various fevers, whereas before Widal's test came into popular use for this disease, the statistical return of fevers was totally unreliable. The sedimentation- or agglutination-test with the serum of cases of undulant fever is extremely reliable and satisfactory in every way. The reaction is nearly always obtainable by the fourth day of raised temperature, sometimes earlier, and seldom later than the sixth day. It is also obtainable in much greater dilutions than is the case with Bacillus typhosus.

After having had very large numbers of these cases under my care, I have found that a dilution of 1 in 50, with a time-limit of half an hour for the agglutination-test, is a reliable, easy, and rapid method of applying the test for this disease. In doubtful cases this test should be supplemented by trials with varying dilutions and by the sedimentation-test.

The serum-test is also very useful from a prognostic point of view, cases with high agglutinating powers usually making a more rapid recovery, especially if the agglutinating reaction gradually increases as the disease progresses; on the other hand, if the agglutinating power is low, or gradually diminishes during the course of the disease, it usually means a very long illness, though not necessarily a severe attack. I have

also observed that with a rising wave of temperature the agglutinating power also rises, but that it generally goes on rising for a day or two after the temperature-wave has reached its extreme height and has already begun to come down.

### PROGNOSIS.

The prognosis as regards life in undulant fever is extremely good, as the mortality from this disease is under 2 per cent.; but the prognosis as to length of attack is very uncertain. It may be taken as a general rule that in cases commencing with one or two high waves of fever and generally acute symptoms, with a serum possessing a highly agglutinating reaction, the attack will be of much shorter duration than in cases with either the remittent or the low type of fever. It must, however, be remembered that any case may suddenly or gradually change its type of fever, and it is quite common to have temperature charts showing all three types of fever at different periods of the same attack.

The tongue is a very good guide as to prognosis, because as long as it remains lightly furred, flabby, and slightly enlarged, the patient is always liable to relapse, even if he has been for two or three weeks with normal temperature; but when once the tongue really clears up and assumes its healthy aspect, then it is pretty safe to say that the patient has really got rid of his fever.

Much disappointment is met with in practice from want of attention to this guiding principle, as patients are frequently sent back to their duties as cured, after their temperatures have remained normal for a week or two, only to return to hospital with relapses in any time from a few days up to three months. In my opinion these cases have not got rid of the organism from the spleen, where it has remained quiescent until such time as the bactericidal power of the blood was again lowered sufficiently in some way, *e.g.*, by excessive fatigue, &c., to allow the organism once more to get the upper hand, when the unfortunate patient has again to go through many weeks or months of fever, just as if it were a fresh attack.

### TREATMENT.

*Prophylaxis.* — Avoidance of infective areas during the months of the year when this disease is most prevalent,

when this is possible, and attendance to the ordinary hygiene of every-day life, would prevent many attacks, if my theory with regard to the distribution of this organism is correct. The histories of a very large proportion of these cases reveal some hygienic indiscretion prior to the attack, the commonest being :—(1) Getting chilled after taking violent exercise ; (2) Sleeping in cotton garments, which become saturated with perspiration ; (3) Being out in a hot sun all day, and returning in the cool of the evening without additional wraps ; (4) Over-fatigue, followed by sitting about in cold draughts ; (5) Drill or other hard work on an empty stomach ; and many other indiscretions of a like nature.

Better sanitation of most of the localities where this disease is endemic is urgently required, as tending to improve the general health ; but people living under what are apparently perfect sanitary conditions are still attacked by this disease.

It may be at once stated that no drug has any specific action on the course of this fever, although a great many drugs in the Pharmacopœia, and several not in it, have from time to time been vaunted as specifics. In the treatment of cases of undulant fever there are three main points to be kept in mind, viz., that the patient is suffering from a febrile disease, which is probably going to last for many weeks or even months ; that it is of the utmost importance that his temperature should be regulated for him ; and, lastly, that the heart should be assisted in its work by every possible means, as not only does the poison of this coccus affect the muscle-fibre of the heart itself, but it seems to have a specially deleterious influence on the cardiac nerve-supply.

The statement is often made that there is no treatment for undulant fever, and yet there are few diseases in which more can be done to ameliorate the patient's condition by a careful attention to detail and by basing the treatment on the three above-mentioned guiding principles.

At the commencement of an attack the patient should be kept in bed, clothed in flannel, because of the profuse sweating, and given a purgative. It is usual to prescribe some form of febrifuge mixture or an intestinal antiseptic. I have generally found Burney Yeo's chlorinated-quinine mixture the most suitable.

After the first few days it will be seen what sort of a course the temperature is likely to run, and the treatment will vary somewhat accordingly. The medicinal treatment of this disease consists essentially in keeping the intestinal tract clean and in a fit condition to digest and absorb food. Purgatives are required in the majority of cases, and a dose of an ordinary mixture containing sulphate of magnesia taken the first thing every morning is a good routine treatment.

*Pyrexia.*—This is a point to which special attention should be given all through the disease, and there is no doubt that the most satisfactory results are obtained by lowering temperature by the external application of cold; either sponging with ice-cold water, ice-packing, or suspending ice in buckets on a cradle over the patient's body. The administration of the usual anti-pyretic drugs, such as phenacetin, antipyrin, or antifebrin, should be discouraged as much as possible in this disease, because of their depressant action on the circulation; as, where a patient's temperature is probably going to run up to unsafe limits very many times, during, perhaps, very many weeks, it means very constant dosage with depressants of the circulation.

The external application of cold should be made use of systematically, and not spasmodically, only when the patient's temperature has run up to 105° or 106°. The best system is to apply cold whenever a patient's temperature goes above 103·6°, to bring the temperature down to 101°, and then to cease application of cold. The principle underlying this treatment is to prevent, as far as possible, the temperature getting to the heights when it throws excessive work on the circulatory system. If this method is adhered to throughout an attack of such a prolonged disease, the amount of work thrown upon the various organs of the body, and the amount of cellular wastage and general tissue-irritation, must in the aggregate be enormously diminished.

In some cases of high fever the external application of cold will not bring the temperature down, even if continued till the patient's skin is blue and cold. In these cases, before having recourse to antipyretic drugs, I have often found that the administration of a copious enema, a pint and a half to two pints, of ice-cold water will have the desired effect of bringing down the temperature. Failing these measures,

recourse must be had to drugs, and of these phenacetin, in 5-grain doses, is by far the most reliable. I have made many experiments with the various anti-pyretic drugs in this disease, having the temperature taken hourly for ten hours after the administration of a dose, and found that phenacetin acted most regularly and constantly, its effect on the temperature usually being perceptible for much longer (averaging seven hours), and its depressant effect on the circulation being less, than in the case of other drugs.

The treatment of the *neuritis* in this disease is on the whole extremely disappointing. When acute, the application of warmth gives the most relief; when subacute or chronic, the administration of salicylates and iodide of potassium, small flying blisters along the course of the affected nerve, inunction with iodide-of-potash ointment, and a host of other remedies appear in some cases to do good, in others to have no effect at all.

For the *cardiac weakness* and irritability, strychnine gives the best results, but it should be administered early and not left till the heart is beginning to show signs of failure. I have found that it gives much more satisfactory results if given hypodermically either once or twice daily for a few days, then omitted for a few days, and so on, according to the condition of the heart, than if taken by the mouth in the usual mixture.

The real treatment of undulant fever consists in keeping the patient in such a condition that he will avoid many of the symptoms of the disease, especially the anæmia, the cardiac weakness, and the neuritis; and this can be done by feeding the patients properly, and so keeping up their strength, weight, and spirits. Two or three years ago the ordinary, and in fact universal, dietary for these cases was a fluid diet, consisting of beef-tea and milk. It was supposed that solid food, even in the very smallest quantities, such as a few grains of rice in the patient's soup, at once made the temperature rise. The only reason why this idea could have lasted so long was the ever-present fear in the mind of the practitioner that he might be dealing with a case of enteric fever, as, until the Widal test came into general use, there was often every excuse for the most accomplished diagnostician being quite unable to decide whether he was dealing with a case of undulant

or of enteric fever. Now, the effect of keeping cases, with pyrexia lasting often continuously for months, on a diet of beef-tea and milk only, and constantly in bed, can hardly be imagined by any one who has not happened to see them. The patients are anæmic, emaciated, and listless, taking no interest in whether they get better or not, often with œdema of legs and feet, purpura, and even bed-sores. The sight of wards full of these miserable objects started me on a series of dietary experiments with the result that the "generous diet" treatment is becoming very generally adopted in Malta, at any rate by the naval and military medical officers on the station though it is harder to persuade the local practitioner to experiment in this direction, as he is still imbued with the idea that grave risk attaches to the administration of solid food.

It is remarkable how well cases of undulant fever will digest solid food, even with their temperatures running fairly high; and it is one of the few diseases where we may trust a good deal to the patient's own feelings in the matter of his dietary, and give him an ample diet, when he declares himself equal to taking it. My routine practice is to keep patients in bed for the first two or three days on fluid diet. Then, as soon as the diagnosis is verified, and the tongue has cleaned, after the administration of saline purgatives and chlorinated-quinine mixture, if the patient's temperature is not going above 103° F. at night, he is placed on solid food in the shape of eggs, bread and butter, and rice-pudding, as well as getting his two or three pints of milk; and again a few days later, if this diet appears to be agreeing with him, he is given fish in addition, or chicken, or butcher's meat, according to his own taste in the matter. Of course if the case is a severe one, with a temperature keeping continuously high, a dirty tongue, and probably diarrhœa, he is kept on fluid nourishment till his fever has altered its character, and the temperature comes down. Stimulants are not usually required in this disease, except when there is a failing heart, when they should be given freely. In cases, however, which are running an ordinary course, with the temperature never going high, a pint of beer or stout is often useful, given with the solid food, as tending to increase the appetite and general well-being of the patient.

Another important point in the treatment of undulant

fever is to decide when a patient should be kept in bed and when allowed up. No general rule can be laid down about this, but the tendency is to keep them confined to bed much too long. In my opinion, patients whose temperatures keep below 102° F. at night benefit greatly by being allowed up for the greater part of the day. The great thing which a patient must not do is to overtire himself in any way, as this generally means a rise in temperature the same evening; but, if that is avoided, the fact of being allowed up and sitting about in the garden seems to have a great effect in cheering the patient up and increasing his appetite, strength, and weight. Each patient's case, however, must be considered separately, with regard both to getting up and to the amount of solid food, as some cases with temperatures not running higher than 102° F. seem to be profoundly affected by the toxines of the disease, whereas others with temperatures running much higher, seem to suffer very little inconvenience from their malady.

If the treatment described is followed, it will be found that patients very seldom become anæmic, the percentage of cases with neuritis is diminished, the body-weight keeps up, and the patient generally is put into a much better condition to withstand all the tissue-changes brought about by such a long-continued pyrexial disease.

## BIBLIOGRAPHY.

The literature of this fever consists for the most part of short articles by naval and military surgeons, either in the official returns of the naval and military medical departments, or published in the various medical journals usually dealing only with some particular point of the disease. The Italian medical journals also frequently contain the same sort of articles. The only book on the subject of which I am aware is *Mediterranean, Malta or Undulant Fever,* by the late Surg.-Captain M. Louis Hughes. (Macmillan and Co., 1897.)

# ADENOIDS: FROM THE PRACTITIONER'S POINT OF VIEW.

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In writing on the subject of adenoids one feels that while one is traversing old ground, it is yet ground over which so many stumbles have been made, and consequently so much controversy has been excited, that it is well, in the light of experience gained in recent years, to clear away the débris of past battles and to state as distinctly as possible those ascertained facts which bear upon the diagnosis, prognosis, and treatment of the condition. With this object in view, it is well to speak dogmatically, dealing, as one does, with facts and basing statements on actual experience. Such dogmatism is safe for the patient, and is advantageous from the practitioner's point of view; for this pathological condition is essentially one that the practitioner should treat, and is indeed quite capable of dealing with.

## DEFINITION AND DESCRIPTION.

Adenoids are hypertrophied masses of the lymphoid tissue, which is normally present in the mucous and submucous layers of the naso- and oral pharynx. The hypertrophy usually affects what is called Luschka's pharyngeal tonsil, a symmetrically arranged, localised collection of lymphoid tissue, $\frac{3}{16}$th to $\frac{1}{4}$th of an inch thick, lying on the arching roof of the naso-pharynx in the position of the basi-occipital and sphenoid bones. It therefore lies immediately posterior to the free margin of the septum nasi, and often impinges against it or even protrudes into the posterior choanæ along the inferior surface of the sphenoid. Quain describes the antero-posterior distance from the nasal septum to the posterior pharyngeal wall, and also the transverse diameter from the Eustachian cushion to its fellow, as averaging 15 mm. ($\frac{3}{5}$ths in.) each, the open space being much less than one usually imagines, and therefore easily obstructed.

Luschka's tonsil exists in the form of longitudinal folds or ridges of mucous membrane, with intervening sulci, of which latter one is central (pharyngeal bursa) and the others radiate downwards and laterally. It contains numerous simple crypts and some racemose mucous glands.

The lymphoid tissue is not uniformly distributed, but is collected in places into masses or follicles, the intervening delicate connective-tissue reticulum containing fewer leucocytes and lymphoid cells. The whole is richly supplied with small blood-vessels. When hypertrophied, the lymphoid development may be sufficiently great to distend the ridges to such a degree that the sulci disappear or become mere potential clefts. The surface of the mass *in situ* then looks uniformly smooth. On the other hand, in less extreme hyperplasia, the ridges are distinctly separated and may even become papillated; hence varying appearances may be assumed—a fact to be remembered when making a posterior rhinoscopic examination. When the tissue is removed and floated on water, the sulci and ridges become obvious.

In addition to the central mass, which is as it were suspended from the roof and posterior-wall, are two lateral prolongations passing behind, and often adherent to, the prominent posterior limb of the inverted U-shaped Eustachian cartilage (cushion), filling the depression (fossa of Rosenmüller) which normally exists behind it, and thence extending a short distance downwards on the lateral pharyngeal wall.

The amount and consistence of the connective reticulum varies, with the result that the adenoids may be soft or firm. Growths which have persisted to adult age, and have been frequently the seat of catarrh or inflammation, tend to become firmer, *i.e.*, more fibrous.

Associated with the disease in the naso-pharynx is an hypertrophy of the numerous follicles of lymphoid tissue lying in the mucous membrane of the oral pharynx, which appear as rounded, raised, somewhat glistening areas, varying in size from that of a pin's head below to that of a split pea above. In addition there is often, though not of necessity, enlargement of the faucial tonsils.

*Secretion.*—The normal secretion of this region is a tenacious clear viscid mucus.

## ÆTIOLOGY.

The anatomical cause of adenoid growth is increased proliferation of lymphoid tissue, and all other causes act by giving rise to such growth. They do this probably by producing chronic congestion or repeated attacks of catarrhal inflammation of the region.

*Age,* needless to say, is an important factor. Rarely adenoids may be congenital; but, although they not infrequently show definite signs and symptoms during the first two years of infancy, they most commonly declare their presence during the third year, from which period they may increase in size, with or without greater intensity of symptoms, until puberty (15 or 16). They may then undergo, on the one hand, some degree of atrophy, or at any rate their symptoms may abate (*see Prognosis*); or on the other they may still continue to undergo hypertrophy and to produce definite symptoms, the latter indeed occasionally increasing in intensity, until adult life—thirty years or beyond. As Berry has shown, the lymphoid tissue of the vermiform appendix increases largely in amount soon after birth; hence it seems possible that about the third year an increase in the amount of the lymphoid tissue of the naso-pharynx normally occurs, and that, if the predisposing causes exist, the development may be excessive, thus giving rise to definite signs and symptoms of respiratory obstruction.

Practically the condition is equally common in the two *sexes,* but individual experience varies; personally I have seen more cases in females.

*Heredity and race* undoubtedly exert an influence in the ætiology of adenoids. Several children in one family may present the condition; or the heads of families thus affected may suffer or have suffered from adenoids, or are deaf and give a history strongly pointing to adenoids; or there are several children suffering from otorrhœa and the immediate relatives suffer likewise. The Hebrew race suffers largely from this pathological condition, as it does from many nasal troubles dependent on the shape and relative capacity of the nasal and accessory sinuses, these conditions probably being precursors of the adenoids.

*Abnormalities of the nose*, such as result in interference with free respiration or produce catarrh and congestion—stenosis of the anterior nares, deflected septum, spurs and crests, chronic rhinitis and hypertrophic rhinitis, congenital syphilis of the nose, atrophic rhinitis, and purulent rhinitis—all tend to the production of adenoids.

*Defects and mal-developments* of the jaws, such as high-arched palate, laterally compressed jaws, cleft palate, &c., are also causes of the condition; so too are *local diseases of the fauces and pharynx*, such as tonsillitis (especially repeated attacks), acute specific fevers, and septic conditions. *Constant cough*, especially when violent, as in whooping-cough and in some cases following influenza, seems to induce the condition; while repeated colds in the head and residence in damp, cold districts are also exciting causes.

## SYMPTOMS AND SIGNS.

When the condition is congenital or develops during the early months of infancy, the child is unable to suck continuously for more than a brief period. Its action is characteristic, as after a few efforts it apparently feels short of breath, relinquishes the nipple, and turns its head away from the breast. It then takes a breath or two, and again resumes attention to the nipple. It soon becomes irritated by its inability to suck continuously and often cries and snatches at the breast. Such a condition in an infant without cleft-palate or abdominal discomfort, who is not teething, should strongly suggest adenoids.

A considerable amount of lymphoid hypertrophy may exist *without giving rise to any symptoms;* on the other hand marked symptoms of nasal obstruction may be produced by small hypertrophies, and the amount removed at an operation, however skilfully and completely done, may be disappointingly small. This may lead at the time to a disbelief in the correctness of the diagnosis; the after-result is, however, satisfactory, if no other factor exist to perpetuate the nasal obstruction.

In a moderately severe case of adenoids the *facial aspect* is characteristic before the age of puberty. The face may be

one of two types, either long and narrow, or short and round with a somewhat *retroussé* nose, the former being far more typical and frequent. The skin is pale; the mouth is open; the upper lip is short and stands away from the teeth; the upper incisors are prominent, and respiration is chiefly buccal. The root and bridge of the nose, owing to the increased bulk of the soft tissues, seem broad and flat, causing apparent widening between the eyes, and giving a somewhat drawn-down inclination to the inner canthus. The anterior nares are of small size and usually narrow; they do not move much on forcible respiration. A small depression, which MacDonald says is pathognomonic of present or past adenoids, exists just above, and in front of, the most prominent part of the alæ nasi. It is, however, not always present.

It must be remembered that the typical facies may be absent in spite of the presence of considerable lymphoid hypertrophy. Its absence, therefore, does not imply absence of adenoids, but its presence is a strong evidence that the adenoids are producing injurious effects and need complete removal.

*Discharge of muco-pus from the nose* is a very frequent symptom. This is thick, ropy, and tenacious, and tends to accumulate in the nose; it is with difficulty expelled and causes considerable annoyance—chiefly indeed to the patient's parents. These children seldom or never blow their noses; and when they do, it is with little effect. There is undoubtedly excessive secretion from the nose and naso-pharynx, but the accumulation is partly due to the inability to clear the nose. Even when the children are sufficiently old and intelligent to use their handkerchiefs, it is surprising how infrequently they attempt to clear the nose. "These children seldom blow their noses, although, by their speech, &c., they always seem to have a cold in the nose." (Macdonald.)

Snoring, restlessness, night-terrors, or unpleasant and distressing dreams, spasm of the larynx (occasionally laryngismus stridulus), and morning headache are other symptoms. When the child goes to sleep snoring commences early and is no doubt largely due to paresis of the palatal muscles, allowing the soft palate to vibrate when the column of air impinges on it. The mouth is kept open to a greater or less extent.

If the child suffers from spasm of the glottis, the snoring becomes louder and louder; respiration is quickened and tends to become "crowing"; there is marked obstruction to the entry of air through the larynx, and the child wakes in terror, usually with a long-drawn inspiration. The patient then falls asleep again and the process is repeated. Very slight cases may result in disturbed sleep and restlessness, and great hypertrophy of the tonsils alone may produce these symptoms. Occasionally true laryngismus stridulus is seen, but it is more than probable that such children also suffer from advanced rickets. In consequence of the disturbed nights and the general interference with respiration the patient wakens unrefreshed and often complains of frontal headache; the general health suffers, and development is retarded. Sweating about the head occurs, especially when the condition is associated with rickets.

*Ear-symptoms*, such as pain, deafness, and purulent discharge from the external auditory meatus, are very commonly present. That there is an extraordinary amount of latent disease of the ear in children has been abundantly proved by careful examination of unselected and consecutive cases; and although the actual proportion found by different authorities varies, yet it is certain that from 60 to 80 per cent. of children suffer from otitis media in some form or other. A great number thus affected present no sufficiently pronounced symptoms to direct immediate attention to the ear. Carhart, in an article in the *Medical Review of Reviews* (1902, Vol. VIII., page 972), directs attention to this otitis as an actual source of infection in the numerous inexplicable cases of acute and chronic infective (pyogenic) processes from which children suffer. He does not enter into the ætiology of the ear-disease; but it is highly probable that the lymphoid hypertrophy in the pharyngeal vault plays an important part in the process, which is an exceedingly strong argument in favour of the total removal of the growth.

The production of otitis cannot be ascribed to any one single factor, but depends upon a combination, thus:—

(*a*) There may be direct extension of catarrhal inflammation from the pharynx along the Eustachian mucosa.

(*b*) The firm adenoid growths may press directly upon the Eustachian cushion, and so interfere with the free interchange of air between the naso-pharynx and tympanic cavity.

(*c*) The bulk of the lymphoid growth, alone or associated with other sources of obstruction in the nasal cavity, may result in a disturbance of the aërostatic conditions in the naso-pharynx. One or all of these factors, combined with paresis of the salpingo-pharyngeus and levator palati muscles, may result in a defective entry of air into the middle ear, and consequent interference with the vascular mechanism. Catarrh results, and the affected ear may or may not become infected with pyogenic microörganisms.

The fact is well established that acute or chronic mischief is often present in the form of catarrhal or suppurative otitis media.

The condition cannot fail to be recognised when ear-symptoms are pronounced, with pain, crying, and restlessness—especially constant rubbing of the occiput against the pillow—and general signs of fever, vomiting, and mental disturbance. These may be followed by perforation of the drum and discharge from the external auditory meatus, which may determine rapid subsidence of the symptoms. Complete healing of the membrane may ensue, or the condition may persist as chronic suppurative otitis. But in the non-suppurative attacks, when deafness and slight pain are present as the only subjective symptoms, these may be entirely ignored, and the presence of ear-mischief missed. No doubt the deafness from which these children suffer largely accounts for the apparent dulness and apathy of intellect with which the subjects of adenoids are credited by their teachers and parents.[1]

In children, therefore, an examination showing retraction of the drum (*i.e.*, a prominent posterior fold), with thinning or thickening of the membrane, and foreshortening of the long process of the malleus, as shown by a more horizontal position, with decrease in the angle between it and the posterior fold, or cloudiness, yellow discoloration, or hyperæmia of the handle

[1] Wilbert: *Deutsch. Med. Wochenschr.*, February 5, 1903.

of the malleus, with radiating injected blood-vessels in the drum, will almost certainly indicate lymphoid growths; and, if the latter be not removed, a sure foundation is laid for increasing deafness, as I do not believe that the deafness due to adenoids acquired in early years spontaneously disappears after puberty. Recurring attacks of acute or subacute otitis strongly point to adenoids, and indicate a thorough examination of the naso-pharynx.

The importance of not overlooking the ear-symptoms cannot be too strongly insisted on; and if they are present near the period of puberty, they should be an important factor in deciding the question of operative or palliative treatment. The deafness varies with the humidity of the atmosphere, and with the swelling which occurs when the patient takes a cold. It is not infrequently then accompanied by buzzing, ringing, or other forms of tinnitus. The patients show a great tendency to catch cold, with increase in the existing symptoms —the mouth-breathing, snoring, deafness, &c. They also suffer from recurring attacks of bronchitis and laryngitis, and not infrequently from the presence of a short, constant, "barking" cough, which is only relieved by removal of the adenoids. The distinctly *nasal speech* in pronounced cases, or the peculiar indistinct, "throaty," thick speech, which seems to occur especially in young adults who have not had their adenoids treated, is, when present, very characteristic; but it is not invariably present even when a large amount of adenoid hypertrophy exists. The pronunciation of the letters M and N is specially defective.

*Mechanical* results of adenoids are seen in pigeon-chest, sternal depressions, changes in the maxillary bones, high-arched palate, overcrowding of the teeth, &c. It is, however, not unlikely that the maxillary defects may be antecedent to, and therefore a predisposing cause of, adenoids in some cases.

*Various reflex symptoms*, such as hay-fever (?), asthma, torticollis, nocturnal incontinence of urine, and laryngeal spasm (*see ante*), are occasionally determined by adenoids.

### PHYSICAL EXAMINATION.

The objective signs of adenoids are readily manifest. On inspection of the pharynx and fauces there may be seen, but

not in all cases, glistening, raised, pallid nodules (if not congested) of varying size on the posterior wall of the pharynx, and perhaps muco-purulent or frothy mucus passing downwards from the naso-pharynx. Hypertrophy of the faucial tonsils is generally present. The uvula is at times slightly œdematous, (*i.e.*, it is more bulky than normal), or congested and deflected. The soft palate does not move freely (*i.e.*, its range of movement is small), and a considerable interval or cleft persists between it and the pharynx on deep phonation.

*Posterior. rhinoscopic examination* in skilful hands shows, with few exceptions, the presence or absence of hypertrophy of Luschka's tonsil. In England it is not so universally adopted as abroad. English children seem hypersensitive to intra-buccal examinations. If, however, an examination is possible, the growth will be found, on following up the posterior pharyngeal wall, to present the appearance of a smooth uniform swelling of maximum prominence in the midline which interferes with the view of the posterior border of the septum nasi, and shuts out more or less the upper part of the posterior choanæ. In certain cases it will show an uneven surface.

The obstruction to the view of the upper part of the septum and choanæ produced by a symmetrical growth is what most strikes one in a well-marked case, in contrast to the free view of the naso-pharynx and somewhat dome-like condition in the normal state. The colour of the lymphoid overgrowth is paler than normal mucous membrane, and it does not show the presence of blood-vessels on its surface. It is often covered with mucus.

*Digital examination* is the most usual method of diagnosis. If skilfully performed by a person with a moderately long finger, post-pharyngeal palpation gives but little discomfort in a great many instances. It is performed by the right index finger, with the patient sitting or standing as preferred. The surgeon stands somewhat on the patient's right and obliquely facing him; the left hand is placed on the patient's head to steady and control its movements. The index finger is now passed, slightly flexed, with its tip towards the right cheek, into the open mouth, and is carried backwards until it reaches the posterior pillar of the fauces, along the back of which it is directed upwards behind the soft palate, the hand assuming the supine

position during this movement. With the finger in the naso-pharynx the presence of adenoids is at once determined; but it is well to find the posterior border of the septum: on tracing this upwards the finger impinges above and posteriorily upon a softish, irregular, indefinite mass. The lymphoid tissue does not interfere greatly with the movements of the finger, but the soft yielding growth gives a quite characteristic sensation. The lateral expansions can be traced behind the Eustachian cushions. On withdrawing the finger a little blood is usually found about the nail or finger-tip, and the presence of this blood is a help in doubtful cases as favouring the diagnosis of adenoids.

Personally I am not enthusiastic in favour of digital examination in every case. A diagnosis may usually be made from a combination of symptoms, but in cases of doubt and in considering the prognosis a digital examination gives further information as to the consistence and thickness of the mass. It must be remembered that a short exploring finger causes considerable discomfort and even pain to patients. It is also well to bear in mind that a few turns of a finger-bandage round the proximal phalanx is a useful precaution to guard against a possible bite.

It is unquestionable that in the majority of young children the post-rhinoscopic mirror will not be tolerated readily, and that the digital examination is often considered inexpedient by the practitioner. On this account another method of testing the permeability of the naso-pharynx will be useful. Though not absolutely diagnostic of adenoids, it is highly spoken of and takes precedence of digital and "mirror" examination with some authorities. That the test is a useful one I have frequently demonstrated on cases before and after operation. It is known as the "*Spray-test.*"

It is based on the fact that if a stream of fluid or a cloud of spray be injected into one nasal cavity, with the mouth open, it will emerge through the opposite nostril in almost equal volume and strength, if the naso-pharynx and nasal cavities are clear. If, on the other hand, there is some obstruction, the fluid or spray will either fail to emerge or will do so in a very feeble stream; the greater part passes into the pharynx and causes spluttering and discomfort. In children under ten years of age nasal obstruction, except from adenoids, is rare; and, by

means of anterior rhinoscopy, anterior nasal obstruction can be eliminated, so that if the spray-test is negative (*i.e.*, there is no emerging stream) adenoids may be diagnosed. Water or sterilised oil can be used for the spray.

*A negative result to Valsava's inflation* is another feature observed in these cases. If a normal person pinches his nostrils firmly, keeps the lips tightly closed, and then blows vigorously down the nose, air will enter the tympanic cavity, and be felt by the patient to distend the drum, with or without a "click." By means of a rubber tube with an ear-piece on each end (otoscope), one of which is placed firmly in the patient's external auditory meatus, and the other in the examiner's ear, the sound of the entry of air into the middle ear can be distinctly heard. In the case of adenoids the obstruction often prevents the entry of air into the ear.

## PROGNOSIS.

In view of the many serious complications which directly or indirectly result from adenoids there can be no question that their removal is desirable, even as a measure of prophylaxis.

The risks from the operation, when both operator and the anæsthetist are skilful, and injudicious after-treatment avoided, is so slight that it may practically be neglected.

The aural complications and their sequelæ offer the most serious outlook, and any child suffering from deafness, tinnitus, purulent discharge from the external auditory meatus, or any other form of ear-mischief, demands a most careful examination of the naso-pharynx and excision of any existing adenoids, even though the amount appear small. It is a common experience to find marked and permanent improvement or cure resulting from operations for adenoids in obstinate cases of otorrhœa in children. The prevalent fallacy that all adenoids spontaneously disappear at puberty by atrophy, and that consequently their secondary results improve likewise, is answerable for a great deal of aural mischief. True atrophy is not the rule, and only occurs in the case of those who have displayed few symptoms and have been free from repeated attacks of catarrh or inflammation, and who also live under favourable hygienic and atmospheric conditions. Symptoms frequently ameliorate

under these circumstances. It is not uncommon, however, to find increase in the severity of the symptoms due to adenoids after puberty, in spite of the relative increase in capacity of the naso-pharynx, resulting from development of the facial bones.

The outlook in general is greatly improved by operation, to an extent disproportionate in many instances to the amount of tissue removed. There is no doubt in my mind that lymphoid overgrowth, with its recurring catarrhs, is largely responsible for the initial enlargement of the cervical and bronchial glands, which renders them more vulnerable to attack by, and infection with, the tubercle-bacillus. Tubercle-bacilli are found frequently in the nasal submucosa even in apparently healthy individuals, and Luschka's tonsil is at times itself affected with tubercle-bacilli and actual tuberculosis.[1] The entry of micro-organisms must be facilitated by the unhealthy condition of the parts which results from catarrh. The exodus of leuco-cytes on to the surface of the mucous membrane is greatly interfered with eventually, and their function, whatever it be, abolished.

Further, it must not be forgotten that, although the direct symptoms of adenoids may improve or disappear after puberty, the indirect results depending upon their continued presence, even in small amount, may continue to exist. One result is undoubtedly the development of progressive catarrh with adhesions in the middle ear. As is now becoming generally recognised, the middle ear in children is the incubating-chamber and origin of numerous infective (pyogenic) processes, the source of which has hitherto been overlooked; and as the otitis is due in probably 80 per cent. to extension from a pharynx affected with adenoids, the removal of the latter is imperative. Any child showing such evidence of respiratory interference as results in "pigeon" chest or sternal depressions demands removal of the adenoids; and if this be accomplished early (before the fifth or sixth year) the defective development and malformation may be corrected. In fact the indications for complete removal are numerous, while indications for palliation are difficult to find; perhaps only in a small minority of well-developed children, in good general health,

[1] Lartigan and Nicol: *Amer. Journ. of Med. Sci.*, June, 1902.

in whom symptoms are few and slight, who have never suffered from any acute sequelæ and who are approaching the age of puberty, may palliative measures be safely adopted. "Adenoids when they exist are potent for harm, though they may not have had the opportunity of working it; this fact makes delay fraught with danger." (MacLeod Yearsley.)

## DIAGNOSIS.

This depends upon the signs and symptoms already given, but not infrequently children suffering from enlarged tonsils are incorrectly presumed to have concomitant adenoids. It is probably correct to say that hypertrophy of the tonsils alone does not result in mouth-breathing. There is no reason why it should. In these cases the spray-test is positive (*i.e.*, normal), and Valsalva's inflation in the majority of cases can be performed; there is also absence of the characteristic facies. The voice, however, is often "throaty," and there may be nocturnal restlessness. The association of enlarged tonsils with mouth-breathing indicates some cause of nasal obstruction, which in young children is almost always the presence of adenoids.

The differential diagnosis lies between:—Fibroma and sarcoma of the basis cranii, mucus polypi of the nose, enlarged inferior turbinals, and occasionally chronic retropharyngeal abscess.

*Fibromata* of the naso-pharynx appear during the "adenoid" age; they are considerably firmer and therefore may prevent free ingress and movements of the finger in the naso-pharynx. They are definite and circumscribed in outline, of a dull-red or purplish colour; and enlarged vessels may be seen on their surface. At first they nearly always cause unilateral nasal obstruction. They are prone to give rise to severe hæmorrhage, on manipulation or spontaneously, the latter resulting in attacks of recurrent epistaxis. They may cause dysphagia, also deformity of the palate and superior maxilla, occasionally producing a peculiar facial deformity. When they become malignant (sarcoma) they give rise to local lymphatic infection.

*Mucous polypi* usually arise at a later age. If they extend backwards into the naso-pharynx a posterior rhinoscopic

examination will show a characteristic bluish-grey colour, and a glistening, smooth, translucent surface, on which fine distinct blood-vessels may be seen. If probed, they are moveable, and they may be unilateral. Anterior rhinoscopy gives similar information, whereas adenoids are practically invisible from the front. Forcible expiration brings the tumours lower and enhances the view. Respiration is of a snuffling character, and distinct discomfort or blockage is felt in the nose. A probe shows the masses to be pedunculated, and of elastic consistence; they cannot be indented in the same manner as œdematous mucous membrane. Sneezing is a very frequent occurrence in cases of polypi.

*Retropharyngeal abscess*, if due to caries, is preceded by signs and symptoms of cervical or occipito-atlantal disease. The head and neck may be slightly flexed on to the sternum; and there is rigidity, pain, and limitation of movement. The swelling is seen to occupy the posterior wall of the oral pharynx and to extend upwards above the level of the soft palate; it is smooth in outline, fluctuates, and gives a sense of tension in many cases. It may be associated with laryngeal distress from œdema and mechanical interference with respiration. Its onset is totally different from that of adenoids and many symptoms are negative. If it be due to trauma or suppuration of the retropharyngeal lymph-gland, its course is more acute and of an inflammatory nature.

*Enlarged inferior turbinals* are usually secondary to some nasal defect, of which evidence can be obtained by anterior rhinoscopy, or they may be concomitant with adenoids. The whole of the turbinals, or either end, may be enlarged; the posterior extremity tends to become papillary.

## TREATMENT.

Treatment may be palliative or radical.

*Palliative* measures consist in topical applications to the naso-pharynx, combined with measures of a hygienic and dietetic nature calculated to improve the general health, and to prevent the development of those predisposing causes which incite excessive growth of the lymphoid tissue, especially

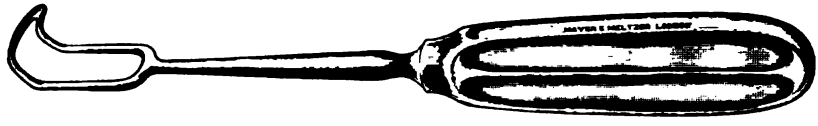
therefore of recurrent catarrhs of the respiratory tract. Such measures consist in residence at a suitable seaside place, where the patient may enjoy plenty of sunshine, fresh warm air, and exercise in the open, along with good plain, nourishing diet; and in the administration of tonics, especially cod-liver oil, maltine, the hypophosphites, syrup of the iodide of iron, and steel-wine. Combined with these, respiratory exercises entailing deep respiration through the nares, and avoidance of mouth-breathing, are advisable; and calisthenic exercises should be performed, calculated to attain this object.

The local applications are of a saline or astringent nature, and act simply by cleansing and astringing the nasal and pharyngeal mucosa, thereby, perhaps, checking catarrhal processes. Thus an injection may be used consisting of 1 drachm of the glycerine of tannic acid in an ounce of water, one teaspoonful in a wineglassful of warm water to be injected down the nose night and morning (Dr. Urban Pritchard). Another formula consists of 5 grains of borax. with 5 grains of bicarbonate or chloride of sodium, 1 grain of carbolic acid, and 20 minims of glycerine, in an ounce of water; to be used similarly to the above.

A combination of the above prescriptions may be used. Palliative treatment is most useful in those cases in which the general health is defective, as a preliminary to operation. Its limits of usefulness are narrow, and unnecessary prolongation of the treatment should be avoided, except in very early cases which show improvement under its action.

*Operative treatment* consists in the thorough removal of the growth, and this is most speedily and, in average hands, most efficiently performed by a *modified* Gottstein's curette. The modification consists in the shape of the curette being altered from that of an oval into that of a square; while the two sides supporting the knife are bent at a slight angle backwards instead of being quite vertical, and are also prolonged at least one inch at a right angle to the vertical to meet the shank (*see* Fig., page 484). Thus plenty of space is provided between the sides for the masses of adenoids to sink into, and the uvula is less likely to be contused. Such a curette is applicable for all forms of the growth, soft or hard, and in big or little patients. Two or three sizes should be available, and the

knives should be sharp. Larger quantities, *i.e.*, thicker masses, of tissue can be removed with this instrument, and with fewer sweeps over the pharyngeal vault, than with any other.



Some operators use forceps of varying shapes and forms; others simply use the natural or artificial nail; while others again use combinations of all three methods. In my opinion, with the modified Gottstein in good cutting condition, two sizes being available for each case, the operation can be done thoroughly, quickly, and without the necessity for the introduction of the finger behind the palate, and I think that this method is most generally useful.

The preparation of the patient may be aided by a previous course of palliative treatment. The immediate preparation consists in the administration of a mild purgative on the preceding night; or, if convenient, the purgative may be given on the night but one before, and an enema on the morning of the operation, as recommended by Hewitt.

The best time for operating is the morning, as thereby the patient undergoes less discomfort and privation. If such a time is convenient, no food should be given after the evening meal, which should always be a light one; but in any case no food should be taken within four or six hours of the operation, and experience strongly supports the fact that milk is best avoided both before and immediately succeeding the operation. A little bouillon, or tea and coffee, with some toast or a biscuit is most suitable.

With regard to *the choice of anæsthetic*, in hospital work "gas," or the recently-introduced "somnoform," is found very suitable, especially for adenoids alone and for use with the curette; but for general "all-round" work the C.E. mixture acts admirably. It is to be remembered that children with adenoids easily become stertorous, and this may lead to the belief that the patient is "deeper under" than is actually the case, and induce the administrator to say the child is ready,

whereas one finds that as soon as the gag is in place the child moves or even cries. In reality the amount of vapour inhaled at each inspiration is small, and a considerable quantity of the mixture is necessary to effect the proper depth of anæsthesia, which should be such that, while time is allowed to adjust the gag, &c., the free administration of air thus secured just effects return of the laryngeal reflex by the time that the removal of the growth begins.

The safest posture for the patient, and one quite convenient for both anæsthetist and operator, is the right lateral, the patient lying on the right side on a fairly high table. The head is placed on some folded towels or a small cushion, so arranged as just to tilt the mouth and face on to a lower level than the rest of the head. The knees are bent to a right angle, so as to prevent the patient from rolling on to his back.

In this position the blood and fragments flow from the mouth and nose, and there is no embarrassment of respiration or danger of blood flowing into the larynx, even though the depth of anæsthesia be pushed a little.

When possible, the wearing of a *small* dental prop facilitates the administration of the anæsthetic and allows the ready introduction of a Mason's gag. In young children a prop will not usually be tolerated at first, but must be introduced as anæsthesia proceeds. In operations under gas in older patients a Wingrave's gag may be worn throughout.

If the case is one necessitating removal of both tonsils and adenoids, I find it easier to remove the tonsils first, and therefore introduce the Mason's gag on the right or lower side of the mouth and remove the upper or left tonsil; then, while a second gag is being placed on the left or upper side of the mouth, I sweep out the blood from the lower cheek with a gauze dab (if necessary), and subsequently remove the right or lower tonsil, afterwards proceeding to the adenoids.

*Introduction of the Curette.*—All instruments are, of course, sterilised and the greatest cleanliness is observed. A good light, either direct sunlight or light reflected from a head-mirror, must be directed on to the fauces. In the case of adenoids one may direct the curette by the left index finger in the absence of light, but it is wiser and safer to secure a good illumination.

The curette is held firmly in the hand with the forefinger extended as in holding a scalpel, and passed into the mouth on its side, *i.e.*, with the knife directed towards the lower cheek. When it has passed the fauces it is turned through a quarter of a circle and passed upwards behind the palate. By well depressing the hand towards the patient's chest the free extremity of the curette is brought into contact with the posterior border of the nasal septum, along which it is pushed upwards to press against the vault of the pharynx, the direction of the instrument is now not far removed from being parallel with the axis of the body. While the instrument is kept rigidly in the mid-line, a clean sweep of the knife is effected by raising the handle towards the forehead, a uniform pressure of the knife against the pharynx being maintained. When the knife reaches the level of the soft palate, as shown by the horizontal position of the handle, it is smartly turned on its side and withdrawn from the mouth, and generally the mass of lymphoid tissue is carried with it.

The second narrower curette is now introduced and is directed to the left lateral angle of the naso-pharynx; and with one sweep this lateral prolongation of the lymphoid mass is removed. Then the right lateral angle is similarly treated without withdrawing the instrument from the mouth. The whole occupies a very brief space of time, the débris coming away with the blood through the mouth or nose. In all, three cuts or sweeps are made, one median and two lateral. The child is immediately turned further on to its face, and the forehead and face are douched with cold water. The bleeding soon ceases, and then the pharynx must be visually examined to see if any tags are left hanging; if so, these are pulled away with forceps. If the child is kept for some time on its side after the smart hæmorrhage ceases, very little blood is swallowed; it is well, however, to warn the parents that, as a little bleeding may persist and some blood has already been swallowed, the patient will later probably vomit some blood.

It is inadvisable under any circumstances to syringe the nose; but the mouth and nostrils may be cleared of blood by means of a little lint or a towel.

*After-treatment.*—Pain is variable and rarely lasts more than thirty-six hours. Usually after tonsillectomy swallowing

is painful for a longer period. The temperature in nervous children may rise a little on the first day.

The patient is best kept in bed for twenty-four to forty-eight hours, after which he may be allowed to get up, but should be confined to one room at a uniform temperature for another twenty-four to thirty-six hours. Then two or three days are spent in the house, avoiding unnecessary changes of temperature and draughts, after which, if the weather is favourable, out-door exercise may be taken. At the end of fourteen days the throat is soundly healed and the patient free from danger.

If after the first week there is much muco-purulent discharge from the nose, an alkaline wash may be used by means of a "boat."

For the first day after operation the diet must consist of fluids, given cold; milk is to be avoided, as it is very prone to produce sickness. Ice, cold water, toast-, or lemon-water may be given when the patient recovers consciousness and asks for a drink. Later on, weak tea, jellies, bouillon, and beef-tea are given. On the second day fluids may be continued or semi-solids given, such as milk-puddings, custard, bread and milk, &c.; and by the third to the fifth day the patient can return to normal diet.

A word of warning may be useful here. As the pharynx after this operation is in a condition very favourable to infection by microörganisms or the exanthemata, the operations should be postponed when there is an epidemic of any illness or a sporadic case likely to infect the patient by contiguity; also, when the sanitary conditions of the immediate surroundings are unfavourable, great care must be taken to secure asepsis and prevent infection. If possible the operation should be done in some more favourable spot.

The snoring and mouth-breathing may continue, and the child should be instructed and exercised in nasal respiration; but should these symptoms persist after a fair trial, some other cause for the nasal obstruction must be present. The speech will gradually improve—though improvement is often long delayed—under careful correction, and as the palatal muscles acquire tone. Recurrence after the age of four or five years is rare; operations performed earlier may be followed

by recurrence of symptoms, perhaps on account of tags which were left behind undergoing hypertrophy and of persistence of predisposing causes, but usually recurrence means inefficient removal.

The *complications* are divisible into immediate and secondary.

The immediate are those appertaining to the anæsthesia, viz., asphyxia and overdose; also entry of blood and lymphoid tissue into the larynx, causing immediate fatality or setting up broncho-penumonia at a later period.

Hæmorrhage may (in males) be due to hæmophilia, also to abnormal position of vessels or to new vessels, or to excessive exertion on the part of the patient, especially if he be suffering from cardiac disease. Hæmophilics may die in spite of all treatment: otherwise the hæmorrhage may be checked by intravenous or rectal injection of calcium-chloride solution, or transfusion of blood from a healthy subject and the local application of calcium chloride.[1] Packing the nares with small portions of ice; syringing the naso-pharynx with ice-cold water, with or without adrenalin hydrochloride, hazeline or tannic acid; or plugging the naso pharynx with a large gauze pad, soaked in hazeline or turpentine and wrung out gently, by means of a Bellocq's canula may stop excessive hæmorrhage.

Bleeding from the tonsil is checked by pressure with the finger or a "dab" held in forceps, or by local styptics; in rare cases of severe hæmorrhage compression or ligature of the external or common carotid is necessary. In *The Lancet* of November 15, 1902, Dr. Escat is reported to have successfully employed a novel method of pressure by suturing the two pillars of the fauces together over a pad placed on the bleeding point.

Earache, deafness, and acute catarrhal or suppurative otitis media are other complications. The first two may develop within the first thirty-six hours, the last within three days. For all cases, except the suppurative, politzerisation is remedial. Politzer himself considers his method of inflation harmless in nearly all cases, but in the acute suppurative cases early paracentesis is to be recommended. The injudicious syringing of the nose, roughness in performing the operation, too much

[1] See *The Lancet*, February 21, 1903, p. 516.

scraping with the curette, and want of care in allowing accumulation of blood in the pharynx are largely answerable for ear-complications, the number of which varies according to the operator and his methods.

The ear should always be examined; otherwise a slight otitis may be overlooked.

Traumatism and sepsis and the infection by diphtheria, tuberculosis, &c., rarely occur. Cellulitis, erysipelas, and extension of suppurative processes to the sphenoidal and other sinuses, and to the meninges, have been known to develop and to produce a fatal result.

# THE DIFFERENTIAL DIAGNOSIS BETWEEN CROUPOUS AND CATARRHAL PNEUMONIA IN INFANTS.[1]

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THE subject which I have chosen for our consideration this evening is one in which I have taken particular interest for a year or two. It is unnecessary to offer any excuse for bringing it to your notice, for I have only to point out its practical importance in order to claim your attention. Pneumonia, including every variety, is one of the commonest diseases of infancy—that period of life when disease is so prevalent and the death-rate so high. It is very frequent as a primary disease, and ranks first as a complication of the various infectious diseases of children. Broncho-pneumonia and diarrhœal affections are the two most important diseases influencing infantile mortality. At a general hospital there is a tendency to minimise the gravity of broncho-pneumonia, a disease preëminently belonging to the age of infancy. This is due to a large extent to the failure to recognise two most important facts, viz., the frequency of croupous pneumonia in infants, and its excellent prognosis. These facts are nowadays well established, but it is still by no means unusual for them to be ignored; and, as a result, many pneumonias occurring in infancy are assumed to be broncho-pneumonia simply on the ground of the tender years of the patient, without regard to the particular features which the disease may happen to present.

Before entering into the differential diagnosis between croupous and catarrhal, or, as I prefer to call it, broncho-pneumonia, it is necessary briefly to define my views with respect to these two diseases as they occur in infancy.

[1] A paper read before the St. George's Hospital Hunterian Society on November 20, 1902.

Croupous pneumonia is a single, well-recognised, acute specific disease. But broncho-pneumonia is not such a simple condition: it is divisible into several varieties, the most important grouping being into primary and secondary. Recently, Dr. Samuel West, in his book on the "Diseases of the Respiratory System," has put forward arguments in favour of considering the primary broncho-pneumonia and croupous pneumonia in infants as one and the same complaint. He classifies them together, and attempts to prove the identity of the two conditions. It is impossible for me at the present moment to enter into this question; suffice it to say that I consider broncho-pneumonia absolutely distinct from croupous pneumonia, even in the case of many of the primary broncho-pneumonias which in some respects resemble the lobar form very closely.

Not only are they different diseases, but in the great majority of cases they can readily be distinguished the one from the other. Having emphasised this, however, I may admit at once that not only is it occasionally very difficult, but it may even be impossible, to differentiate between them. This may be due to the fact that on rare occasions cases arise in which either intermediate forms exist, or both diseases attack the same patient at the same time. But the differences between croupous and catarrhal pneumonia are usually well marked. Before proceeding to consider these differences in detail I will briefly enumerate those of most importance.

*Croupous pneumonia* in the infant differs in few essential features from the same disease in an adult. It is characterised by its sudden onset, its continued high temperature and hurried respiration, its critical ending, and its rapid resolution. The consolidation of the lung is lobar; it is the result of fibrinous exudation. The physical signs of the pneumonia develop rapidly, and are well-defined. Expectoration and rigors are practically never seen in infancy, but vomiting at the onset is common. Herpes is less frequent than in adults, and cough is seldom distressing: also it is noticeable that laboured breathing, inspiratory dyspnœa, and cyanosis are usually absent, or, if present, seldom prominent. A hot skin and some prostration are generally observed. The prostration is great early in the disease, and afterwards, as a rule, steadily diminishes. Convalescence

is rapid, and the prognosis is good. Empyema and otitis media are common complications.

*Broncho-pneumonia,* although including several distinct varieties, usually presents well-marked features, which make up quite a different clinical picture from that occurring with croupous pneumonia. The onset is more gradual; the disease is often secondary to bronchitis, or one of the exanthems. The temperature undergoes marked remissions; the course is prolonged, resolution is slower, and the disease ends by lysis. The consolidations of the lung are lobular, and are produced by a cellular exudate; and the signs to which they give rise are generally mingled with signs of bronchitis. Signs of consolidation are slower to develop, and are often ill defined. Cough is more constant and distressing than in croupous pneumonia. Cyanosis is common; and real dyspnœa, often with some recession of all the soft parts of the chest, is noticeable. Prostration is greater than in croupous pneumonia, and steadily increases. Convalescence generally proceeds gradually, and the prognosis is bad. Empyema is a rarer complication, and when it occurs it is usually smaller than that which arises as a complication of croupous pneumonia.

Other important points of difference between the two forms are:—Broncho-pneumonia is more frequent in delicate, rickety, or debilitated children, whereas croupous pneumonia very often attacks those previously healthy. In broncho-pneumonia the bacteria associated with the disease are various, although the pneumococcus is much the commonest; but in croupous pneumonia the pneumococcus is practically always the cause of the disease. Relapses in broncho-pneumonia are not infrequent, which is not the case with croupous pneumonia.

Having thus briefly summarised the differences between croupous and broncho-pneumonia, I will now proceed to consider some of them more fully.

*Anatomical Differences.*—In croupous pneumonia a circumscribed consolidation of the lung, usually involving one lobe, is due to the alveoli and the terminal bronchi becoming filled up with the inflammatory fibrinous exudate. Cells, chiefly leucocytes, are relatively scarce in the exudate, and the walls of the bronchi are hardly affected. In most cases this consolidation clears up rapidly and completely, and there is but

little tendency for the inflammation to affect the framework of the lung. In broncho-pneumonia, on the other hand, there are small scattered lesions widely and often irregularly distributed, consisting of small patches of consolidation with occasional areas of collapsed lung and compensatory emphysema. The consolidated alveoli and the terminal bronchi are choked with an inflammatory exudate, chiefly made up of epithelial cells, leucocytes, and red blood-corpuscles. The large bronchi are the seat of a superficial inflammation, while in those of small size the entire bronchial wall is affected; and there is a great tendency for the connective-tissue framework of the lung to become involved.

Occasionally, even from post-mortem appearances, it is difficult to be quite certain which variety is present; for the consolidation of broncho-pneumonia may be confluent and widespread; it may be unilateral, or even affect only one lobe. Even microscopically the case is not always plain. In a letter which I received on this subject a little while ago from Dr. Henry Ashby, he referred to the fact that in some "cases, clinically catarrhal, fibrinous exudation can be found in the acini by microscopical examination." Some of these cases belong, no doubt, to the group of intermediate forms already referred to, unsatisfactory as it is to classify them thus. All that can be added on this point here is that anatomically dependence must be placed upon the fact that in broncho-pneumonia the separate lobules are distinguishable in some place or other, and upon the surface of the consolidated area being less firm and granular than in croupous pneumonia; while microscopically the greater amount of leucocytes and epithelium, and the smaller amount of fibrin and blood-discs, point to broncho-pneumonia.

*Ætiological Differences.*—Croupous pneumonia is a primary disease due to the pneumococcus; the Fränckel-Weichselbaum diplococcus occurs in at least 90 per cent. of the cases of this disease. Broncho-pneumonia is often a primary disease, and also often due to the pneumococcus; but it is with equal frequency secondary, and several microörganisms besides the pneumococcus give origin to it. The commonest diseases to which it is secondary are measles, whooping-cough, diphtheria, bronchitis, acute and chronic diarrhœal affections, and marasmus. It is difficult to estimate the frequency of the occurrence of the

pneumococcus in broncho-pneumonia: in this disease also, however, and especially in the primary forms, it is very common. But besides it there are many other microörganisms capable of giving rise to the disease. The most important are streptococci, staphylococci, Friedländer's bacillus, and occasionally Pfeiffer's bacillus of influenza.[1] The bacteriology of broncho-pneumonia is summed up by saying that, in primary cases, usually the pneumococcus produces the disease, while in secondary cases there is probably, as a rule, a mixed infection, the streptococci being the most important microörganisms.

*Differences of Onset.*—In tiny babies it is not always easy to appreciate exactly when they are taken ill, especially if they are in the care of some unobservant mother or indolent nurse. But even in such cases a history pointing to rather a sudden onset can generally be obtained when the disease is croupous pneumonia. It is stated in some text-books that in infants convulsions commonly take the place of the rigors of adults. Considering the great frequency of an initial rigor in the croupous pneumonia of adults, if this statement were wholly true, convulsions should be a common symptom at the onset of this disease in infants. But this mode of onset is not nearly so frequent as the comparison would suggest. As a matter of fact an initial convulsion occurs in only about 5 per cent. of cases. Croupous pneumonia does not often begin with symptoms suggesting cerebral disease; but when this type of onset does occur, it is much more frequently ushered in with "typhoidal" or "meningeal" symptoms, such as drowsiness, stupor, delirium, head-retraction, meningeal cry, or frequent purposeless vomiting, than with a convulsive seizure. Although, as a rule, pulmonary symptoms are prominent from the start, it is not very infrequent for them to be slight; they may then be masked by the cerebral symptoms just mentioned, or, perhaps more often, by abdominal symptoms, such as lead to the idea that acute gastritis or acute entero-colitis are the sole lesions. In the case of broncho-pneumonia, on the other hand, the disease generally develops more gradually during the course of two or three days. Symptoms of catarrh often usher in the disease, and attention is immediately drawn to the lungs. The cerebral type of onset is rarely seen in broncho-pneumonia, and

[1] Dr. H. Meunier, *Archives Générales de Médecine*, 1897, Vol. I., p. 129.

at the beginning symptoms suggesting acute gastric or intestinal disease are less frequent. When such modes of onset do happen, they seldom mask the pulmonary symptoms, for indications of affection of the lungs are nearly always prominent early in the disease.

*The aspect and general condition* of the patient is, I consider, one of the most important aids, often the most important, in arriving at an appreciation of the difference between croupous and broncho-pneumonia, and in diagnosing one from the other. To begin with, the facies of a baby who is struck down with croupous pneumonia is characterised by a look of surprise. This facial aspect, associated with tachypnœa of a moaning and jerky kind, with active movement of the alæ nasi, and with considerable prostration, may suggest distress, particularly if, as may often occur, there is pain—pleuritic pain of a sharp nature —to add to the other conditions. But such a facies is quite different from the keen look of distress which is seen in a typical case of broncho-pneumonia of moderate severity. This difference in the facial aspect is associated with, and largely dependent upon, a difference in the character of the *dyspnœa*. In broncho-pneumonia there is inspiratory, obstructive dyspnœa, with laboured breathing and recession of the chest-wall. The great rapidity of the respirations characteristic of croupous pneumonia may occur in broncho-pneumonia, but the dyspnœa possesses also the quality just mentioned, which is but seldom seen in lobar pneumonia. Only occasionally is considerable recession seen in the latter. Moreover, in broncho-pneumonia the patient is occasionally subject to severe paroxysms of increased dyspnœa, and this feature is absent in croupous pneumonia. Similar differences occur also with respect to *cyanosis*. It has already been stated that this is most marked and more constantly present in broncho-pneumonia. Sometimes, late in a case of croupous pneumonia, especially if it should be double, when respiratory failure is beginning to set in, cyanosis is very great; but in an ordinary case blueness is but little noticeable; whereas, in broncho-pneumonia, if the disease is in the least severe, well-marked cyanosis will be present, and the worse the disease, the worse the cyanosis. If we take cyanosis again in conjunction with the physical signs, most important conclusions may be drawn. If there is great cyanosis

in croupous pneumonia, there will be well-marked and extensive signs of consolidation. If there is much blueness in broncho-pneumonia, many bronchitic signs are present, and possibly signs of consolidation may be indefinite. At the end of a croupous pneumonia in which slight cyanosis has been present, the blueness will disappear when the usual adventitious sounds of resolution occur; whereas in broncho-pneumonia, when more adventitious sounds arise, cyanosis gets worse, and the general condition of the patient deteriorates.

I have already stated that in croupous pneumonia *cough* is seldom a distressing feature. If it does arise, there is a tendency to suppress it; this is probably due to the pain which it causes. But in broncho-pneumonia cough is almost always a well-marked feature, and very often a distressing one. The cough is not suppressed; sometimes it is harassing and constant; sometimes it is very wheezy, and often paroxysmal. The strength and loudness of the cough are frequently helpful points in determining prognosis. A soft, wheezy cough, steadily becoming weaker, usually means a broncho-pneumonia of progressive severity. When a cough does occur in croupous pneumonia it will be of a sharp, fairly clear character.

*The Course* of the two diseases is typically very different. The average length of croupous pneumonia may be put down at one week, and that of broncho-pneumonia at three weeks. Convalescence in the former proceeds rapidly, in the latter slowly. In croupous pneumonia it is often remarkable how quickly appetite comes back and convalescence advances, as soon as the temperature has dropped, even though well-marked physical signs still remain. Frequently, two days after the crisis, the appetite is ravenous, and the patient appears to be practically well except for a little pallor and some debility. But in broncho-pneumonia the general condition of the patient improves coincidently with the physical signs and never apart from them. Again, broncho-pneumonia is much more liable than croupous to take on a chronic form, and there is a tendency to relapse in the former disease. With respect to the clinical course of the disease the most difficult cases to diagnose are without doubt the primary broncho-pneumonias. Some of these have a sudden onset, and

a high and fairly even temperature; and they run a short and often favourable course. Under these circumstances dependence must be placed upon the other points already emphasised, particularly upon the cyanosis, and upon the character of the dyspnœa, as well as upon the physical signs.

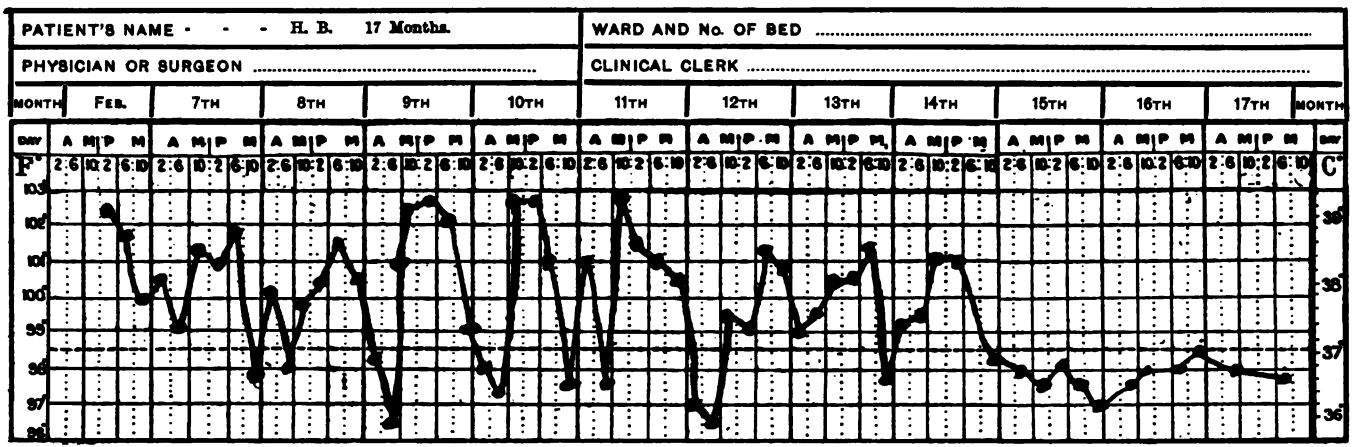
One of the most difficult cases which I have recently met with was in a small baby, seven months old, who was in the Queen Victoria Ward of this hospital, under Dr. Penrose, last February. This was a patient suffering from primary broncho-pneumonia with a sudden onset. In her case extensive signs of consolidation quickly developed on the right side: these were not only well defined, with well-marked dulness, tubular breath-sounds, and bronchophony, but also limited to one lobe, the lower. Râles were audible only on the side with the consolidation. The temperature was continuously high. For a day or two nearly every point seemed to indicate that the disease was croupous pneumonia. But the cyanosis, inspiratory dyspnœa, and prostration, which were only slightly noticeable to begin with, soon became very great, so that, in spite of the physical signs, sudden onset, &c., broncho-pneumonia was suspected. This view of the case was confirmed by the appearance, on the day before death, of râles in the opposite lung, and by the examination which was made after death.

Again, in connection with the course of the disease, confusion may be caused sometimes by the latency of a complication. Often for some days the existence of a complication may be unrecognised; pyrexia will continue and apparently the primary disease is protracted. This is especially liable to occur in croupous pneumonia followed by otitis medis or empyema.

*The Type of Temperature* is one of the most helpful indications in the diagnosis. It is, perhaps, unnecessary to emphasise the importance of taking the temperature every four hours in babies; but the point should never be forgotten, for a chart of the temperature taken only twice daily is often fallacious. The continuously high fever associated with croupous pneumonia is seldom present in broncho-pneumonia; it is seen occasionally with the primary forms. When a high and even temperature does occur with broncho-pneumonia, the prostration of the patient is very great, and the case is very liable to advance rapidly to a fatal issue. A very high temperature—I mean

one of 105° or 106°—is more frequently observed in croupous pneumonia than in broncho-pneumonia; it does not necessarily indicate a bad prognosis in the former disease. Difficulties may arise also from a croupous pneumonia having a remittent temperature. Remissions of 4 degrees are common in broncho-pneumonia, but rare in croupous pneumonia. When they do occur in the latter disease it is usually either for one day soon after the onset, or for a short time towards the close of the disease. This is, I believe, more liable to occur in cases that run a longer course than the average. Not infrequently, however, croupous pneumonia will be met with in infancy, in which there is a well-marked remittent temperature throughout. This occurs rather oftener during infancy than at other periods, and again, perhaps, more frequently in those with a long course. It is possibly due to the greater frequency of pleural involvement amongst infant patients. These remissions, as a rule, are of only 3 degrees, and the temperature does not reach the normal; but rarely the fever is truly intermittent in type, the temperature varying 4 or more degrees, and dropping occasionally below the normal line. The accompanying chart of a baby of 17 months, who was in this hospital last year under Sir I. Owen, is a good example of this. At first sight this temperature-chart would suggest that the case was not croupous, but catarrhal, pneumonia, and certainly, if stress was laid entirely upon the type of pyrexia, that would be the opinion to hold with regard to it, for the chart shows exactly the type of fever usually present with the latter disease. But it was a case of croupous pneumonia. The most important points upon which I based this diagnosis will be shown by giving a short account of the case.

The patient was an example of a case with delayed or latent physical signs. The baby had been ill for several days before admission to the hospital. On admission he was obviously ill, and his aspect favoured very strongly the view that pneumonia was present. The temperature was 102°, the pulse 176, and the respiration 68. Vomiting occurred; but no abnormal physical signs could be discovered in the chest. It was not until four days later that these made their appearance. When they did appear, they very soon became quite definite, and were those of a well-marked consolidation limited to the




TEMPERATURE-CHART OF UNUSUAL CASE OF CROUPOUS PNEUMONIA.

right upper lobe. They remained limited to that region, and after a few days rapidly cleared up, the baby making a fairly quick and quite complete recovery.

*Differences in Physical Signs.*—The physical signs are in accordance with the character of the pulmonary lesion. In lobar pneumonia the consolidation is continuous over a large area; there are no healthy air-containing pulmonary alveoli in between solidified patches. Hence signs of consolidation are usually definite and extensive. The lesion is generally unilateral, and often its margin, which may be quite sharply marked off from healthy lung-tissue, corresponds to the limits of a lobe. In broncho-pneumonia there may be no signs of consolidation; but when they occur from close aggregation of several patches, they are liable to be less definite and less extensive than in croupous pneumonia, and less sharply defined at their margins: occasionally, however, they may be quite as well marked as in lobar pneumonia. With regard to the site of consolidation, there is for some reason a preference for the left lower lobe or the right upper lobe in croupous pneumonia, but in broncho-pneumonia there is no preference for any particular lobe. Well-marked apical consolidations are common with croupous pneumonia, while in broncho-pneumonia they seldom occur unaccompanied by consolidations elsewhere. "If the pneumonia is primary and at the apex only, it can be pronounced lobar without hesitation," is a quotation from Dr. Emmett Holt's book. If extensive consolidations occur in broncho-pneumonia they are most frequently at the base, though occasionally first observed about the root of the lung.

Bronchitic adventitious sounds are usually present in broncho-pneumonia, and inconspicuous or absent in lobar pneumonia. It is very rare in infants to hear, in the latter disease, those very fine crepitations of early consolidation which may sometimes be found in adults before definite signs of solidified lung have made their appearance. The râles of resolving consolidation are, however, frequently heard. In broncho-pneumonia râles are heard throughout the disease, but in croupous pneumonia they are very seldom persistently present. Sometimes some crepitations of pleural origin may be more or less constantly present in the latter disease, and these may be difficult to distinguish definitely from intra-

pulmonary râles. Attention must be paid to the sharper, harder character of the former, to their nearness to the ear, and to their relation to the breath-sounds and cough. But in any case the fact that the râles, typically fine and metallic, are heard only over the consolidation, while there are none elsewhere, is an important one in distinguishing croupous from catarrhal pneumonia.

In croupous pneumonia it is the rule for well-marked signs of consolidation to appear soon. Occasionally, however, there may be latency of pulmonary signs for a few days. Amongst rather older children I have known a latency until after the crisis. But in infancy it is rare for the physical signs of the pneumonia to be delayed for more than a day or two; they are nearly always quite distinct by the fourth day of the disease. It is the common thing, too, for resolution to be rapid and for the signs to clear up quickly. On the other hand a latency of pulmonary signs is hardly ever seen in broncho-pneumonia. In the terminal broncho-pneumonia of chronic marasmic babies, or of very small debilitated infants, the signs of the condition may be very meagre and there may be no fever; but that is altogether a different kind of latency from that which occurs with croupous pneumonia, and even under these conditions a complete absence of abnormal pulmonary signs is seldom observed. Again, in catarrhal pneumonia signs of consolidation may occur first quite late in the disease, in contradistinction to their early appearance in lobar pneumonia. Moreover, resolution in broncho-pneumonia is slow, the signs clearing up gradually; and sometimes there is a tendency at first for the resolution to be incomplete.

There is one point which may be mentioned here as a cause of occasional misinterpretation of the physical signs present, and that is the ready way in which râles may be conducted from one side of the chest to the other in infants. Attention must be paid to the loudness and character of the râles. If they are conducted, they will have exactly the same character as the râles on the side presenting other signs of a lesion, but they will be slightly less intense. Also it will be noticed that they lose their intensity and loudness the further they are from the middle line, so that when the stethoscope is about the posterior axillary line, they cannot be heard at all clearly. Moreover, as

a rule, a conducted râle may be said to be added to the breath-sounds, whereas an ordinary râle partially replaces them.

There is a not very infrequent exception to the rules already laid down to which reference must be made. Croupous pneumonia in adults may be observed accompanied with bronchitis —sometimes with a profuse bronchitis. This condition occurs occasionally in infants also; so that you cannot depend upon the presence of general bronchial catarrh as invariably pointing to broncho-pneumonia.

*Prognosis and Complications.*—The prognosis is very different in the two diseases. Croupous pneumonia in itself is not any more serious in infants than it is at any other period of life. It is in fact, in my opinion, less serious. Complications are rather commoner than amongst adults, otherwise the prognosis would be very good indeed. The majority of infants with croupous pneumonia recover. One authority estimates the death-rate at 4 per cent. (Holt); another records 7 deaths out of 64 cases, *i.e.*, 11 per cent. (Henoch). At Shadwell last year, of 60 cases of croupous pneumonia in patients under 2 years of age, 12 died; this gave a percentage in these cases of 20. But it must be remembered that there is a liability, owing to the great pressure on the beds, for only very severe cases of croupous pneumonia to be admitted; also that this figure is from practice amongst the ill-nourished babies of the East end. Thomson says, "The prognosis in croupous pneumonia is very favourable considering how ill the child generally seems to be. Unless he is very feeble, or the disease complicated, or a large area of the lung or lungs affected, the case is almost certain to end in recovery." From the above statistics I should estimate the death-rate of croupous pneumonia in infants at about 12 per cent., which is below the death-rate from this disease at all ages, estimated by Taylor at 17 per cent. Now in broncho-pneumonia we have to deal with a very different state of affairs. At Shadwell the death-rate last year from this disease in patients under 2 years of age was 70 per cent. Holt gives the average mortality of the broncho-pneumonia in patients under 3 years of age as 65½ per cent. Practically all these cases die from the disease itself, and not as the result of any supervening complications. This mortality varies somewhat with the age of the patient and with the nature of the broncho-pneumonia in

respect to its origin. The younger the patient the worse the prognosis. Broncho-pneumonia, secondary to diphtheria, acute ileo-colitis, or scarlet fever, is practically always fatal; that secondary to whooping-cough is more fatal than that secondary to measles. The primary broncho-pneumonias are the least serious.

With regard to complications, besides those already mentioned, there occasionally may be seen, following croupous pneumonia, suppurative meningitis and pericarditis, or more rarely pneumococcic pyæmia. It is important to remember also that broncho-pneumonia may supervene upon a pneumonia originally of a purely fibrinous type. After broncho-pneumonia chronic interstitial pneumonia may ensue, or sometimes tuberculosis is grafted on to the lesions, and then generally a fatal termination quickly ends the case. Pulmonary abscess may follow either variety of pneumonia, but is perhaps rather commoner with broncho-pneumonia. It is rare in either case.

Finally, I would emphasise the fact that a diagnosis cannot be based upon any one point, but upon a carefully-balanced and well-considered appreciation of all the evidence for or against each disease. Although it is possible to lay down a number of rules for our guidance in making the differential diagnosis between croupous- and broncho-pneumonia, it is all-important to realise that all of the rules have their occasional exceptions, and that a correct diagnosis, though in the majority of cases easy to make, can in difficult cases only be reached by thorough investigation and accurate observation of each detail, and by weighing the evidence thus obtained with judgment.

## A CASE OF ACUTE PANCREATITIS.

By WHEWELL HOGARTH, M.D. (Lond.), F.R.C.S., and
B. G. A. MOYNIHAN, M.S., F.R.C.S.

B. S., 75 years old, was a short, stout old man who had, until the day of his illness, led a fairly active life. He had been accustomed to eat heartily, and had been subject to attacks of vomiting at intervals, without any pain, for the last 20 years. For the last two years he had had more persistent dyspepsia. On Sunday, November 2, 1902, he had a very hearty midday dinner; this was followed by a sensation of distension which persisted all the afternoon until about 5 p.m., when he vomited; from this he expected instant relief, such as he generally experienced, but after vomiting once or twice he became conscious that something unusual was happening. He now began to feel pain in the epigastrium, which rapidly grew worse, and at last became agonising. I (W. H.) was summoned at 9 p.m.

When I saw him, he was walking about the room in acute agony, retching every few minutes and trying to belch. His pulse was full, regular, and 80 per minute. His temperature was subnormal, and his tongue clean; there was no collapse nor any history of its having occurred. He was too restless and impatient to allow me to examine the abdomen, so I gave him a hypodermic injection of ½ gr. of morphine and waited 40 minutes; and then, as he appeared little or not at all relieved, I gave him another ¼ gr., and got him to bed.

His bowels had always been regular and had been freely open that morning, he had never had abdominal pain before; in fact, there was no history of any illness with the exception of the above-named dyspepsia and a former slight attack of bronchitis. His urine was normal, and with the exception of a few râles there were no physical signs of thoracic disease.

I saw him next day (November 3) at 8 a.m. He had had a bad night and was still in very great pain. He was retching continually, but bringing up only a little mucus and water. The pulse was now 88, and temperature still subnormal. The

abdomen was full, but not distended: it was quite resonant all over, and there was no rigidity of the abdominal walls. The liver-dulness was present and normal in extent. High up in the sub-costal angle he was tender, but not acutely so; and he complained of intense pain in the epigastrium, but nowhere else. There was no jaundice, the abdomen was quite supple, even in the epigastrium, and moved with respiration. I gave him ¼ grain of morphine.

As to the nature of the condition, I had in mind perforated gastric ulcer, biliary colic, and acute obstruction. I first eliminated obstruction, because the pain and tenderness were confined to the epigastrium, and there was no remission in the pain and the retching. There was no regurgitant vomiting, and there was nothing to remind one of the colicky pains of obstruction. I therefore remained divided in opinion between biliary colic and perforation.

I saw him several times in the course of the day, and, when I had eased him, he was fed per rectum and given normal salt-solution also by the same channel. His pulse-rate rose to 100 per minute, and he continued to retch at intervals. His temperature remained subnormal, though he felt hot; his tongue was dry and coated with yellow fur, but he had nothing in the nature of sweating or rigor, nor did he ever have such throughout his illness. There was no jaundice, and the urine was bile-free. I proposed an exploratory operation rather inclining to the diagnosis of perforated gastric ulcer in spite of the difficulties. Indeed I never gave the pancreas a thought, although I was not ignorant of the fact that cases of hæmorrhagic pancreatitis had been described, and that the usual symptoms were those of acute obstruction. The patient, however, definitely refused operation, and so I continued the injections of morphine.

On November 4 he was much easier; he still retched occasionally and complained of some pain in the epigastrium, but the tenderness was not at all great and was still strictly localised. There was no rigidity, but the abdomen was more distended and tympanitic. His temperature was still subnormal, but his pulse-rate had risen to 110. He seemed in remarkably good condition, and would insist upon getting up and going downstairs; the bowels were now freely open.

He had a bad night; and on the next day he continually vomited a dark sour fluid, which was without any fæculent odour. It was brought up without any trouble—apparently typical peritonitic vomiting.

The abdomen was now greatly distended, but there was still no rigidity, and very little tenderness; the latter was only present in the subcostal angle. The pulse-rate was 120, and the temperature still subnormal. The tongue was dry and thickly coated, whereas, in my limited experience, the tongue towards the end of a case of fatal peritonitis is usually clean and moist. The lower parts of the abdomen and the thighs and legs showed large bluish-black blotches such as I have never seen before except in those in a dying condition, and which I have commonly noticed towards the end of cases of purulent peritonitis; but as he had no abdominal aspect—his features being full and calm and the eyes not sunken—I did not give a fatal prognosis, although I feared he had an abdomen full of pus, and that in a day or two he would die.

On November 6 he was about the same; his pulse was 124, and his temperature subnormal. There was occasional retching. His bowels had moved twice of their own accord, and two very bulky black motions had been passed, the colour being probably due to the fact that he had been taking bismuth by the mouth. The abdomen was less distended and less tympanitic.

During the following days (November 7–12) his symptoms all gradually abated. The retching was now very occasional, and the bowels acted very freely. The abdomen became less distended, and the blotches disappeared. There was no tenderness except on very deep pressure; indeed there was practically nothing abnormal in the abdomen. He took and kept down plenty of milk, and his pulse-rate fell to 80 per minute.

On November 14 he was not quite so well; the abdomen was still normal, but the pulse-rate had begun to rise and the temperature reached 100° F. at night. This was the first rise of temperature which had occurred, and the patient seemed very weary.

On November 15 and 16 the pulse was 104, and the temperature 101. There were no rigors or sweats.

On November 17, deep down in the abdomen there could be felt very indistinctly a rounded lump projecting downwards into the right hypochondrium, in the region of the gall-bladder.

From November 18–20 he was obviously losing ground; he had lost his appetite, and expressed his belief that he was going to die. His temperature was constantly a little raised, and his pulse-rate kept steadily rising. The above-mentioned lump was now much more distinct, and there was a fulness right across the epigastrium (pulse, 120; temperature, 101). There was no pain, nor any great tenderness or tympanites.

On November 21 there was plainly a large swelling stretching quite across the abdomen, just above the umbilicus, from one nipple-line to the other; the rounded mass could be clearly made out and felt just like a distended gall-bladder, and there was a roll about the size of a thumb in front of the main mass, lying transversely midway between the ensiform cartilage and the umbilicus. There was complete resonance all over the abdomen, also over the mass; the liver-dulness was normal, the apex-beat was in the usual position, and lung-resonance was normal. He had had a peculiar motion which was passed quite suddenly; his nurse said that it was extremely foul-smelling, and seemed to contain a lot of little yellow seeds swimming in the black fluid, but I did not obtain a sight of it. It was followed immediately by normal motions. The rectum was at once digitally examined, but showed nothing abnormal, and the swelling remained the same.

I now diagnosed an abscess of the lesser sac of the peritoneum, due to a perforation of a gastric ulcer in the posterior wall of the stomach, and I at last got consent for Mr. Moynihan to explore the abdomen next day.

During the whole illness the patient had never lost flesh, nor had he at any time the Hippocratic facies. His niece, who attended him, was quite sure he had never passed any fatty stools.

### NOTES BY MR. MOYNIHAN.

On examination of the patient I found a general slight distension of the whole abdomen, which was naturally big; and there was some rigidity. Both were more marked above

than below the umbilicus. On careful palpation a distinct tumour could be felt; it occupied the right hypochondriac and the epigastric regions, extending from the region of the gall-bladder to the middle line. Along the lower margin of the stomach a rounded, thickened cord, about equal in size to the middle finger, was felt, stretching away to the left and becoming gradually lost. The tumour was diagnosed as a distended gall-bladder, with some adhesion and local peritonitis around it, or as an effusion into the lesser sac, which was perceptible on the right side, but concealed on the left by the general abdominal enlargement. If the latter were the condition we considered that it would be due, presumably, to the rupture of a gastric ulcer on the posterior surface of the stomach. No mention of the pancreas was made in our discussion as to the causation of the condition. We felt sure that the fluid in the tumour would be purulent, partly because of its rapid formation and increase, and partly because there was a persistent elevation of temperature.

I opened the abdomen through the right rectus. There were many adhesions, involving the omentum, the gall-bladder, the stomach, and the duodenum. The tumour was then recognised as pushing forward the stomach; and when the finger was passed backwards above the stomach, the lesser omentum was felt to be bulging forwards. While separating adhesions, a small hole was made in the lesser omentum, and pus immediately gushed out. The general peritoneal cavity was protected by gauze packing, while the opening in the omentum enlarged, and a considerable quantity (not less than two pints) of blood-stained fluid evacuated from the lesser sac. The pancreas was found to be necrotic and friable, breaking down into fragments when touched; it constituted, in fact, a slough. Much of it was removed, but more was felt to be necrosed. Two large drainage-tubes were passed through the lesser omentum into the lesser sac, and gauze drains were packed round these. The abdominal wound was partly closed, room being left for the drainage-tubes and gauze. The patient's condition was poor throughout the operation, and he never rallied from the shock, dying about twelve hours later.

The specimen removed *post mortem* by Dr. Hogarth

showed that all the body and tail of the pancreas were necrotic. That portion of the head immediately embraced by the duodenum alone was healthy. There was extensive fat-necrosis in the omentum and the surrounding fat.

The patient died at 2 a.m. on Sunday, November 23, 1902. Only a very limited *post-mortem* examination was possible, and this was made through the wound, the incision being converted into a crucial one for the purpose. There were a few ounces of clear fluid in the peritoneum; the serous surface of the intestines was normal, and there was no great distension of the gut. The omentum looked normal, but was hard, tough, and greatly thickened, and the collapsed transverse colon ran through the thickened mass. In the right hypochondrium all was normal. The gall-bladder was a little larger than usual, and contained a large stone; there was no pus in this region, nor any matting of the parts. The foramen of Winslow was quite closed. The stomach was adherent towards its cardiac end to the diaphragm; the adhesions were recent and easily broke down, and the hand could be passed easily all over the anterior surface. Upwards the hand passed back through the lesser omentum into the cavity where the drainage-tubes were.

Below, on tearing through the great omentum, a mass of fibrous fat was encountered; and on cutting through this, immediately below the greater curvature of the stomach, a large, ragged, dark-grey, foul-looking cavity was exposed, stretching from the left of the middle line. It was impossible under the circumstances to define its limits accurately, but I picked out of it a large slough similar to those removed at the operation, but bigger.

I removed the parts mentioned by Mr. Moynihan and sent them to him for further examination. The fat-necrosis was very plainly to be seen, as the small white patches contrasted in a marked manner with the yellow tissues around them.

# A CASE OF SEVERE PNEUMOCOCCIC INFECTION.

## (ACUTE GLOSSITIS, ARTHRITIS, DOUBLE PNEUMONIA, AND DOUBLE EMPYEMA.)

By NATHAN RAW, M.D., M.R.C.P. (Lond.),
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It is now generally recognised that acute croupous pneumonia is always caused by the presence of the diplococcus or pneumococcus of Frænkel. Recent observations, however, have shown that this organism is by no means confined in its action to the lung, but may produce serious lesions in many different parts of the body. In the great majority of cases the lung is primarily affected, and after resolution of the pneumonia the pneumococcus is conveyed in the blood-stream to the serous membranes, and particularly to the joints, where it produces a violent pneumococcic arthritis. It must, however, be borne in mind that this organism may cause primary lesions in the body without pneumonia being present; and in these cases the difficulty in diagnosis is great, depending entirely on a bacteriological examination.

Weichselbaum's statement in 1888 is now recognised as certain :—"The Diplococcus pneumoniæ can cause not alone pneumonia, but also various other processes, either at the same time as pneumonia or entirely independent of it. Cases are recorded of pneumococcic tonsilitis, stomatitis, lymphadenitis, ulcerative gastritis, enteritis, peritonitis, meningitis, myelitis, otitis media, parotitis, cellulitis, phlebitis, endocarditis, pericarditis, pleuritis, orchitis, ovaritis, metritis, nephritis, osteomyelitis, and arthritis."

I will add to this formidable list a primary lesion which, so far as I know, has not been observed, viz., acute glossitis, the details of which I will describe later.

The first published case of pneumococcic arthritis in this country was by Cave,[1] who recorded a case under his own care, and also tabulated all the existing cases, numbering 31, up to that date. Subsequently I published[2] a series of seven cases

which I had observed amongst a large number of cases of pneumonia. Strange to say, I have not seen a case for over one year, although there have been over 200 cases of pneumonia in the hospital in that time, which suggests the varying virulence of pneumonic infection at different periods.

Leroix,[3] in his classical paper on Pneumococcic Arthritis, tabulated 30 cases which he had collected from the literature, and pointed out the serious lesions which might be set up by the pneumococcus. This list has been added to by other observers, making at present a total of 52 cases. Herrick,[4] in a splendid paper read before the Association of American Physicians at Washington in 1902, reviews the subject most fully, and his paper practically represents our knowledge of the action of this organism in the human body.

The case I am about to relate is certainly the most severe pneumococcic infection I have ever seen, and presented great difficulty in diagnosis at first, until the pulmonary symptoms appeared. It illustrates the rapidity with which a person may be poisoned by the toxines of the organisms, if they become in any way generalised in the system, and also proves how rapidly pus may be formed.

*Clinical History.*—A. S., aged 41, married, a healthy and well-nourished woman, was suddenly seized on January 19, 1903, with great pain in the tongue and inability to open the mouth. Her tongue rapidly became enlarged, so much so that she was unable to breathe through the mouth. On admission the same day to the infirmary she was in a pitiable condition, unable to close her mouth, which was widely distended with an œdematous and greatly enlarged tongue. The lymphatic glands in the neck were also enlarged and very tender to the touch. Her temperature was 103° Fahr., and her pulse 130.

Under prompt treatment the swelling rapidly subsided, and her temperature on the 22nd (two days after admission) dropped to 100° Fahr. She appeared comparatively comfortable; the glandular swelling subsided, and on examination of the throat and fauces nothing abnormal could be found. In fact, she seemed to be recovering, when she suddenly had a rigor on the 22nd, and the temperature ran up to 104° Fahr.

On careful examination of the lungs she was found to have the early symptoms of acute croupous pneumonia at the left base, with intense pleural pain. The infection was very rapid, and soon involved the whole of the lower lobe. The patient appeared to be more seriously ill than an ordinary attack of pneumonia would warrant, and she had early in the course of her illness a toxæmic condition, which is generally in pneumonia of bad omen. The fever, however, subsided by lysis on the sixth day, reaching the normal on the seventh day, with the usual symptoms of resolution.

For two days her temperature remained normal, but in spite of this she looked ill, and her condition was not satisfactory. On the 29th she had another rigor, and her temperature began to rise again. She complained of intense pain over the left parotid region with inability to open the mouth for more than half an inch.

On examination of the right lung acute pneumonia was found present; and, as in the case of the left lung, it rapidly spread over the whole of the lower and middle lobes. The patient at this time being very weak, her temperature did not rise very high, but her pulse was small and rapid with occasional intermission.

On January 31 the swelling over the parotid was incised, and about 4 ounces of thin, milky-white pus were evacuated. The pus was very deeply situated, and the temporo-maxillary joint was felt to be opened. The character of the pus was such as one generally sees in pneumococcic infections, viz., very thin and milky in appearance. Under the microscope and stained with McConkey's stain, which defines the capsules, pneumococci were easily found, and cultivations on agar showed the typical appearances.

The pneumonic condition slowly subsided, and we were congratulating ourselves on the favourable termination of the case when another rigor predicted more trouble. She had intense pain in the left side, with the rapid sweating so often seen in the early stages of empyema. On February 8 a needle inserted into the left pleura revealed the same kind of pus which had been evacuated from the face, and microscopically and bacteriologically it was identical. We had thus to deal with a pneumococcic pneumonia of a severe

type, associated with a serious systemic infection. Two days afterwards another rigor signalised a further extension, and a needle found pus in the right pleura, so that the poor woman had a double empyema. As much as possible was aspirated, first from one side and then from the other, on two or three occasions; but as quickly as it was removed it seemed to reäccumulate, and as her condition was becoming rapidly hopeless, it was evident that unless her breathing was relieved by draining the pleuræ she would soon die. Her husband was called, and her serious condition explained to him. Being a sensible and grateful man, he consented to any treatment considered necessary. On February 14 the patient being almost *in extremis*, she was given a small quantity of ether and chloroform in equal parts on a piece of lint. An incision was made into the right pleura and about two pints of pus evacuated. A large double drainage-tube was inserted, and as the operation had decidedly improved her breathing, she was turned round, and an incision rapidly made into the left pleura. A great quantity of pus was let out and a similar tube introduced.

Although the shock was great for an hour after the operation, her breathing soon became easier and her pulse improved in force and frequency. She had several hypodermic injections of one-fifteenth of a grain of strychnine, which had a most excellent effect. Two days after the operation she was decidedly improved, and there was every probability that she would recover. Her temperature had dropped to normal (pulse 80, respiration 40), and she was able to sleep naturally.

The advice generally given is not to open both pleuræ at the same time; and I should think as a general rule it is better to open one side, and to aspirate the other, draining it later by operative measures.

In this case the woman was so seriously ill that I considered it better to give her all the relief possible by draining away all the pus, and so allowing both compressed lungs more freedom. Moreover, I did not think it desirable to risk a second operation. So far this line of treatment has been justified; and one can only hope that there will be no further extension of the infection.

The general treatment carried out in the case—apart from

the surgical—was that usually employed in a severe case of double pneumonia. Large linseed poultices, made with a little mustard, applied to the chest, gave the patient immense relief and comfort. Carbonate of ammonia and digitalis were given every four hours, with bromide of potassium in 20-grain doses also every four hours. At night she was given 2 drachms of paraldehyde, with excellent effect; and I should like to add here that for cases of pneumonia there is no better hypnotic, its great advantage being its perfect safety. It was necessary later on in the course of the disease to give brandy in half-ounce doses every four hours; and as this rather disagreed it was changed, and the same quantity of champagne substituted with marked effect. The bowels were gently regulated with mist. sennæ co.

The case is one of great interest—first, as showing the severe and unusual onset with acute glossitis; and, secondly, because of the affection of the temporo-maxillary joint, followed by such a severe infection of the lungs and double empyema.

She is a brave and patient woman, and bears everything without a murmur, a most important factor in prognosis.

I am indebted to my house physician, Dr. Richmond, for his intelligent devotion to the case.

## References.

[1] Cave: "Pneumococcic Arthritis," *Lancet*, January 12, 1901.

[2] Raw: "Pneumococcic Arthritis, with Notes of Seven Cases," *British Medical Journal*, December 21, 1901, Vol. II., p. 1803.

[3] Leroux: "Les Arthrites à Pneumocoques." Paris, 1899.

[4] Herrick: "Pneumococcic Arthritis." Washington, 1902.

## A CASE WITH COMMENTS.

### PRIMARY SARCOMA OF THE APPENDIX.

By PETER PATERSON, M.B., C.M., M.R.C.S.,
*Assistant Surgeon, Glasgow Royal Infirmary.*

[With Plate XLVI.]

THE following case of sarcoma, from its unusual situation, may be worthy of record:—

The patient, a man 39 years of age, came under my care with a history of having had a feeling of uneasiness in the right iliac region for the previous three months; the discomfort increasing at times to a sharp pain. These exacerbations, of which there had been four, lasted several days, and then gradually subsided, till only the uneasy feeling remained. The bowels acted regularly, except during these acute attacks, when they were constipated, though flatus still passed. There had never been any vomiting.

When seen for the first time the patient was suffering from one of the severer attacks. This had commenced two days previously with a severe pain in the region of the appendix, accompanied by nausea. Since the onset the pain had been constant and distinctly localised to the region of the right iliac fossa. The bowels had not moved since the beginning of the attack, though flatus was being passed. Appetite was impaired. The pulse was soft and its frequency 110 per minute; the temperature was 100·8° F. Palpation of the abdomen, which was somewhat distended, revealed a distinct mass, tender on pressure, in the right iliac fossa. All the other viscera were apparently healthy. Three days later, when the acute symptoms had subsided, an incision was made over the region of the swelling and the appendix exposed. This structure was found much thickened, firm to the touch, and bound down by adhesions posteriorly, whilst the omentum was coherent to its apex. The cæcum was also somewhat thickened for a radius of about ¼ of an inch round the attachment of the appendix. The adhesions were separated, and the appendix, together with the thickened part of the cæcum,

was removed. The opening was then closed. The patient never rallied from the operation, and died a few hours later.

Careful post-mortem examination failed to show any trace of tumour-formation elsewhere, and the part of the cæcum that remained appeared healthy. The appendix, on removal, was bent almost to a right angle and measured 16·5 cm. along the larger curvature, and 10 cm. in circumference at the thickest part. The peritoneal covering on the anterior surface was normal in appearance, whilst that on the posterior was destroyed by the adhesions. At the angle of the bend there was a small quantity of inflammatory exudate. Longitudinal section of the structure demonstrated the fact that the increase in size and firmness was due to a thickening of the walls; this thickening being most marked in the distal half, and diminishing irregularly as it approached the cæcum. Ulceration at the angle had almost produced perforation (Fig. 1). The lumen, which was constricted in some parts and dilated in others, contained a small quantity of pultaceous material.

On microscopical examination the increase in bulk was found to be due to a round-celled sarcoma (Fig. 2) infiltrating all the coats with the exception of the peritoneal. The mucous membrane had almost entirely disappeared in parts, only the bases of the glands remaining. The neoplasm had evidently commenced towards the apical part of the appendix, and extended along the walls towards the cæcum; the small part of the latter that was involved showing very little infiltration.

Sarcoma of the alimentary canal in any part of its course is not a common disease, and it is especially rare for this condition to involve the appendix. So far as I have been able to ascertain only one case is recorded[1] where this was the only structure implicated in the lesion.

[1] Glazebrook: "Case of endothelial sarcomata of vermiform appendix." *Virginia. Med. Month.*, 1895-6, XXII., 211.

PLATE XLVI.

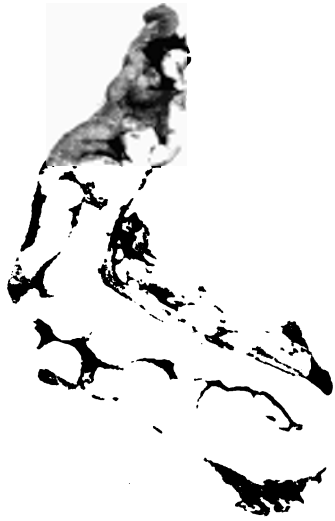

Fig. 1. *Sarcomatous Appendix.*

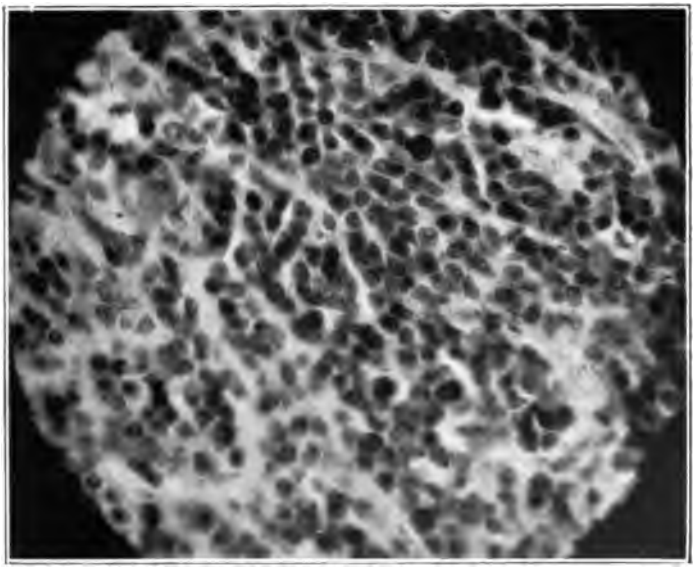

Fig. 2. *Microscopical appearances of Sarcoma of Appendix.*

# A REVIEW OF RECENT WORK IN THE FIELD OF GYNÆCOLOGY.

By JOHN PHILLIPS, M.A., M.D. (Cantab.), F.R.C.P.,

*Obstetric Physician, King's College Hospital, and Lecturer on Practical Obstetrics in King's College; Senior Physician, British Lying-in Hospital.*

## PELVIC CELLULITIS AS A COMPLICATION OF UTERINE FIBROIDS.

Dr. Cabot (*Boston Medical and Surgical Journal*), 1902, p. 428) considers that a large proportion of the deaths which occur after operations on fibroids results rather from complications than from any actual surgical damage; and he strongly urges all observers carefully to study and report any cases in which unusual symptoms have occurred. He describes two cases of death after hysterectomy for fibroids in both of which the same

Fig. 1. *Fibro-myomata removable by vaginal myomectomy.*[1]

complicating condition existed. The first case died in three days, having had a rigor within twenty-four hours of the operation. The necropsy showed the line of incision firmly united,

[1] For the loan of these illustrations, taken from Dr. Giles's paper, we are indebted to the courtesy of the Editor of *The Clinical Journal*.

and the stump of the uterus in good condition, "with some slight infiltration of blood in the sub-peritoneal tissue about it." A small abscess without distinct walls was found beneath the parietal peritoneum, but separated from the stump by a considerable tract of healthy tissue. The second case also had a rigor on the night of the operation, and died after three and a half days' illness. The necropsy showed a healthy stump and wound, and a small cavity containing pus lying outside the peritoneum in the pelvis. Both cases, the author concludes, died from a profound septicæmia. He then proceeds to discuss the possible origin of the septic poison. "Either septic

Fig. 2. *Fibro-myoma removable by vaginal enucleation.*

material has been introduced at the time of the operation, or some septic process, already present but inactive, has been waked up and made active by the manipulations. In both of the cases reported a careful post-mortem examination failed to show any inflammation of the operative wound, or of the peritoneal cavity. There is, therefore, no evidence of sepsis introduced at the time of operation, and we are left with the belief that in both of them an inflammation already existed in the pelvic wall outside of the peritoneum, which was stirred into activity by the operative procedure." The author then discusses the probable route of extension, and thinks the lymphatics were the means of conveyance of the septic germs. The author admits that he discovered no trace of

these preëxisting septic foci at the operations, which were performed in a good light.

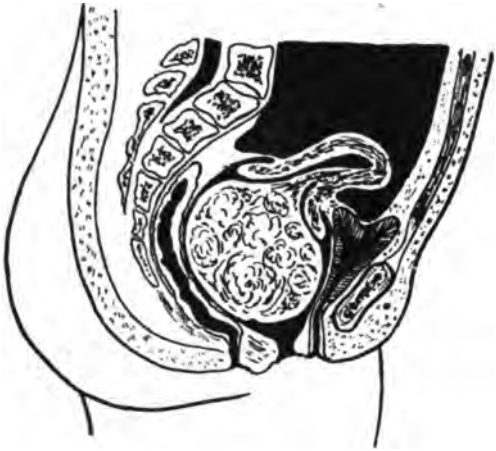

Fig. 3. *Fibro-myoma removable by vaginal myomectomy with morcellement.*

Three different methods of treating fibro-myomata have been recently advocated by well-recognised operators. Herzfeld (*Wiener Med. Wochenschr.*, 1902, Nos. 27–28) considers it essential to remove these growths by the vagina whenever they are accessible. He advocates total extirpation with enucleation or *morcellement*. His objections to the abdominal procedure are, the prolonged anæsthesia, the much greater

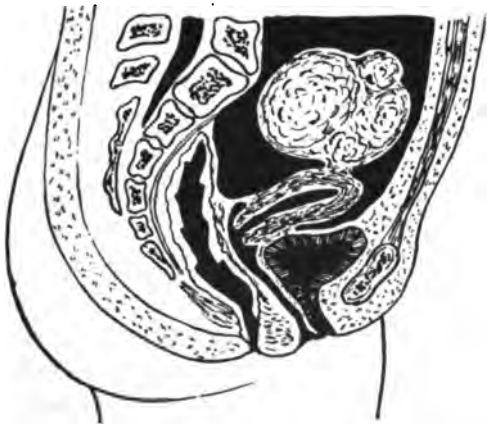

Fig. 4. *Fibro-myoma removable by abdominal myomectomy.*

damage done to the peritoneum, and the unfavourable exit for discharge. In addition, in a large number of cases, the heart's condition is not satisfactory. Lafourcade (*Semaine Médicale*, 1902, No. 44) has given up total hysterectomy for the supra-vaginal operation. He has performed 72 abdominal hysterectomies with four deaths, and the last 42 cases without a death. Loubet (*Revue de Gynécologie*, 1902, VI. No. 2) is strongly in favour of enucleation as practised by Tuffier. He reports 34 cases with four deaths, three of which were due to serious and avoidable mistakes with regard to personal asepsis. This would reduce a mortality of 11·76 per cent. to one of 2·94; while the percentage of pan-hysterectomy is 9·68 per cent. and that of supra-vaginal amputation 4·5 per cent. Loubet strongly advises in all cases of enucleation to dilate the cervix the day before by means of tents, thus allowing of free drainage. The uterus should be opened if possible in the anterior median line and sutured by two layers of silk. Should the uterine cavity be opened, as occurred in 12 of his cases, it is safer to put in a good sized india-rubber drainage-tube.

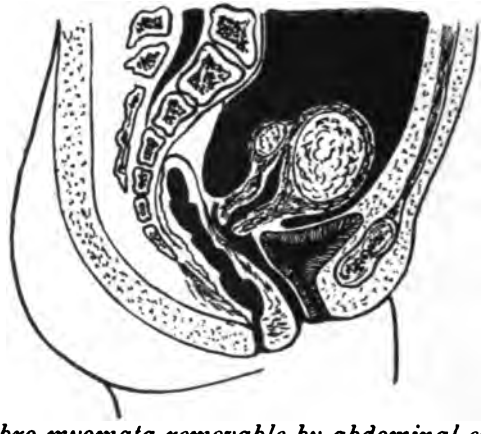

Fig. 5. *Fibro-myomata removable by abdominal enucleation.*

Franklin H. Martin (*Western Medical Review*, 1902) considers that properly carried out the percentage mortality for hysterectomy should be only 2 per cent. at most, and that this, therefore, should be looked upon as the routine treatment for such cases. He, however, recommends electricity (1) as a general local tonic for the relief of pressure-symptoms and reflex pain; (2) in interstitial fibroids where operative interference

is refused by the patient; (3) in interstitial fibroids of small size where hæmorrhage is the chief symptom and when the patient is within a year or two of the menopause.

Giles (*Clinical Journal*, 1902, vol. XX., No. 14, p. 222), in a paper on "The surgical treatment of Fibro-myomata of the Uterus, with illustrative cases," considers the conditions which call for surgical interference are—(1) excessive hæmorrhage; (2) pressure-symptoms; (3) great and continued pain; (4) chronic disablement due to one or more of these conditions; (5) rapid growth; (6) evidence of septic or degenerative changes; and (7) interference with labour. He classifies the

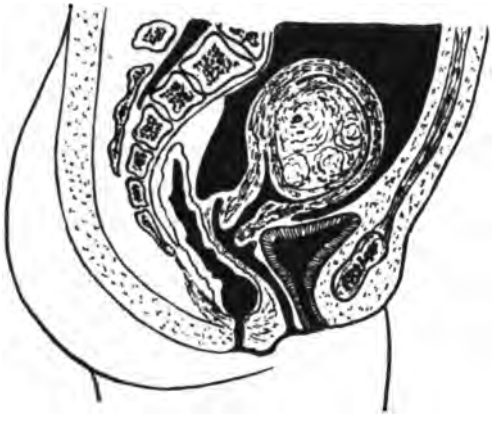

Fig. 6. *Fibro-myoma removable by abdominal hysterotomy.*

operative measures into vaginal operations, *i.e.*, myomectomy, enucleation, *morcellement*, hysterectomy; and abdominal operations, *i.e.*, myomectomy, enucleation, hysterotomy, hysterectomy, pan-hysterectomy, &c. He illustrates his paper by various cases. He concludes his remarks by observing that the object of his paper has been "to indicate the widely different methods that are applicable to the surgical treatment of myomata, and to emphasise the fact that no single plan is by any means appropriate to the treatment of all cases, each of which requires to be dealt with individually on its merits. Of course, the keynote of the whole thing is conservation, by which I understand the preservation of organs, in so far as this is compatible with the immediate safety and the subsequent health of the patient." The accompanying illustrations are taken from Dr. Giles's article.

## ENTEROPTOSIS.

Under the term "general enteroptosis" (*Medical News of New York*, 1902, vol. LXXX., p. 1227), Dr. Robert T. Morris

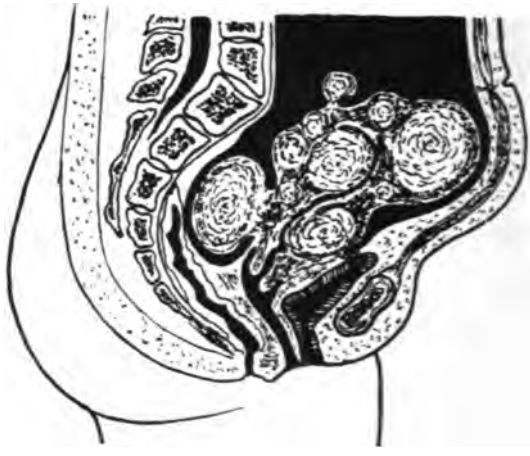

Fig. 7. *Fibro-myomata requiring abdominal hysterectomy.*

describes part of a group of events and states that the term "may be used for classifying the rather common cases which are marked by relaxation of the peritoneal supports of the viscera." He well describes the chain of causes by which this condition may be produced. "A young woman wears a snug corset. This is a splint. Under splints muscles generally become atrophic in other parts of the body, and it is fair to assume that the abdominal muscles are not different from other muscles in this respect. If the corset engages the lower rib-line and prevents the liver from sliding over the right kidney as it should in normal respiratory movements, the liver has a range like the piston rod of a pump and it crowds the right kidney away from its loose anchorage." By an ingenious argument he proves that general enteroptosis takes place by graduated steps. He notes that most women suffering from this condition are more or less invalids; they are never quite well, and never quite bad enough to submit to surgical procedure for relief. As treatment he advises the corset which has been the cause of all the mischief, because it is too late to dispense with it, and it must be applied while the patient is lying down, and after the liver and kidney have been replaced.

The dyspepsia which results from pyloric kinking and the tension on the gastro-colic ligament may be attended by fermentative features which are best relieved by lavage of the stomach. Abdominal massage and electricity properly and persistently applied "will make the abdominal muscles develop and will stimulate the functions of the abdominal viscera to

Fig. 8. *Fibro-myoma obstructing labour removed by Cæsarean hysterectomy.*

such an extent that many an enteroptosis patient can be relieved of most of her invalidism." Should these palliative measures fail the author operates by a free incision, opens up the peritoneum and sutures the organ as required. He strongly advocates rapidity, so as to avoid shock; and "all the work with the exception of the suturing of the skin and muscle sheaths should be completed in ten minutes from the time of beginning the operation."

Matthew D. Mann, in his "Report on Recent Advances in Gynæcology" (*Philadelphia Medical Journal*, 1902. Vol. X., p. 685), considers that one of the most startling recent innovations is spinal cocainisation. Very serious objections, however, exist to its use. It is not so harmless as is claimed.

Recluse reports that in Europe during March 1901 there were six deaths in about 2,000 cases; this is a much larger death-rate than is usually found associated with general anæsthesia by ether and chloroform. There seems a tendency now to restrict its use to those cases in which general anæsthesia is not advisable.

### ANTISEPSIS OR ASEPSIS.

With regard to the method of antisepsis towards which much attention has been directed, there seems a general feeling that antiseptic solutions should be banished from the operating room, and that asepsis should be the watchword rather than antisepsis. A perfectly aseptic and absorbable ligature is still to be found. Catgut seems to be the most usual form, while kangaroo-tendon is favoured by many. Experiments carried out in Buffalo show that Bissell's method of preparation of catgut ligature has nearly reached the desideratum. The catgut is soaked in a solution of bichloride of mercury in ether, varying the period of immersion according to the size of the gut. It is then boiled in alcohol to remove the perchloride. This produces an absolutely sterile ligature. "Organotherapy," including exhibition of thyroid, mammary, and ovarian extracts, has not been marked by any great success. Thyroid extract is certainly of service in some hæmorrhagic fibroids, but the other two appear to be inert. The author also alludes to the new preparation of silver introduced by Credé: "as an antiseptic it has the great advantage of being powerful in its action and at the same time perfectly harmless to the system of the patient." It is given in the form of collargolum which is soluble in the proportion of 1 to 25; it does not coagulate albumen and remains in solution in the blood. "For instantaneous injections 5 to 15 grains may be used in a one-half of 1 per cent. solution. If 1 per cent. of albumen is added to the solution, it is much more stable and may be kept for a considerable time." "Credé claims the most remarkable results from the use of this drug in various septic conditions, particularly in puerperal sepsis." It is a preparation which may be freely used and has apparently no bad results. The author has had no experience of atmokausis, or treatment of the interior of the uterus by steam, chiefly for hæmorrhage; he thinks that the element of danger which

obviously exists in carrying out the treatment prevents observers resorting to its use. He is of opinion that it will undoubtedly have a very short period of usefulness.

### OPERATIVE PROCEDURES.

In the treatment by operation of retroversion, cancer and fibroids of the uterus nothing new seems to have been brought forward. There is perhaps a more general tendency to "thoroughness" in operating for cancer, but the results obtained are conflicting and unsatisfactory. With regard to the treatment of suppuration in the pelvis, many arguments are used for the vaginal and the abdominal routes respectively. One fact is very clearly demonstrated however, and that is that "when suppuration follows labour and is therefore likely to be due to one of the more infectious germs, like the streptococcus, it should never be opened through the abdomen, but always attacked from below. The spreading of infectious streptococcus pus in the abdomen is almost certain to end fatally."

H. Briggs (*Medical Magazine*, 1902, vol. XI., p. 667) gives his view on "The Curette and Curettage in Gynæcological and Obstetrical Practice." He considers that this instrument is rightly classed amongst the most valuable and generally useful instruments at our disposal. He points out how it may fail entirely as a means of diagnosis, as in cancer at the orifice of the Fallopian tube. The paper by Hunter Robb is analysed, and it is found that in 60 cases of endometritis in which curettage was carried out, no patient was cured; 40 were relieved permanently and 19 temporarily. It is possible to curette away 75 per cent. of the endometrium in a supposed case of endometrial hyperplasia without in any way affecting the menorrhagia or metrorrhagia.

It is not known why a fibroid is very frequently attended by some form of hæmorrhage; in some cases the endometrium is thickened, in others unaffected. It is quite experimental treatment to remove the endometrium by curettage, with a view to arresting the hæmorrhage. He concludes his paper by stating that "the curette, though adapted to the accomplishment of a free removal of endometrium, is nevertheless largely inefficient as a means of cure or relief in

gynæcological practice." In obstetrical practice he summarises his views thus: "The less the curette is used the better."

### UTERINE DISPLACEMENTS.

Dr. Davenport in "The Present Status of the Pessary in the treatment of displacements of the Uterus" (*Boston Medical and Surgical Journal*, 1902, Vol. CXLVII., p. 145) gives a review of this mode of treatment during the past 25 years. He thinks that this period almost covers the development of surgical methods and "the consequent relegation into the background of so-called minor gynæcology." From the earliest times mechanical means were resorted to for the support of a displaced uterus, and as bimanual examination became more perfected other displacements were discovered, all of which it was thought could be relieved by some special apparatus: hence the present collection of pessaries. "The greatest impulse in a surgical direction" was given in 1889 by "Alexander, who at that time published his account of the operation which has since gone by his name" (*i.e.* shortening of the round ligaments). "Later the principle of the Alexander operation has been adopted with modifications, such as the intra-abdominal shortening of the round ligaments, and other procedures which need not be more definitely described here." The author is of opinion that as a whole, during the past year or two, there has been a steady reaction against surgical methods, and the view that symptoms necessarily arise from a uterine displacement. He holds that displacements do not necessarily produce symptoms. "If a woman's general health is kept up at a satisfactory level, a displacement may not show itself by any disturbance whatever. This is particularly true of backward displacements, less so of prolapse. But let such a woman become the victim of any unusual strain, either physical or mental, and the insignificant lesion of the pelvic organ will then become an important factor in keeping her below par."

In women who have married and gone through child-bearing another class of displacement arises, viz. lesions of the pelvic flow, cervical, vaginal and perineal lacerations, with damage to the fibres of the levator ani: these demand treatment, usually surgical, although a pessary may give

temporary relief. Davenport thinks that in a retroversion with lacerations of various parts of the pelvic tract replacement alone of the uterus, or suture alone of the part, is insufficient; both must be treated to make the woman well. In choosing a method for fixing the uterus, the size of the uterus and the presence or absence of a prolapse must be considered. Shortening the round ligaments is useless in an enlarged, bulky uterus, and hence suspension is the better procedure. Anteversion rarely gives rise to any symptoms, and antiflexion is a deformity, not a displacement.

The author concludes his very common-sense paper with six rules, which may be quoted in detail :—

1. Study the cases. Determine the probable length of time that the displacement has lasted, its possible cause, the symptoms it has caused, their order of occurrence and the relative importance of the general and local manifestations, and from these data form a careful opinion as to the chances of cure by one or the other methods of treatment.
2. In a case of retroversion or flexion, always replace the uterus before adjusting the support. The pessary should not be relied upon to do this, as only in the rarest case will it be possible.
3. In fitting a support choose one which fits exactly if possible, but if not have it rather too small than too large.
4. The ideal pessary is one which supports the uterus perfectly and without the patient being conscious of its presence.
5. The patient should be kept under observation while she is wearing the pessary, and seen at regular intervals, preferably after each monthly period, for the cleansing of the support and its replacement.
6. When it is deemed wise to make an attempt to go without it, it should not be removed at once, but a smaller one substituted to be worn a month, and then a still smaller one, which may then finally be removed.

# SOME RECENT SURGERY OF THE NERVOUS SYSTEM.

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## THE SURGICAL TREATMENT OF EPILEPSY.

Sir Wm. Gowers, in his able article on epilepsy in Allbutt's *System of Medicine*, dismisses all surgical treatment, save trephining, by the sentence: "It would be a waste of space to describe the various operations that have been advocated, whether on arteries or on the sympathetic nerves, 'which have their day and cease to be,' fashions which are not much to the credit of the profession." Of all these various operations—counter-irritation by seton, ligature of the carotid and of the vertebral arteries, "sympathectomy," and trephining — one alone and that the most ancient of them all, viz., trephining, has stood the test of practical experience, and seems likely to remain the only surgical procedure in well selected cases.

It is true, however, that bilateral "sympathectomy," or Jonnesco's operation, is still practised on the continent. As originally introduced, it was performed by Jonnesco for various maladies, and he reported (*Archives des Sciences Médicales*, 1899) 61 cases in which he had done the operation. Of these, 43 were cases of idiopathic epilepsy, one of epilepsy with chorea, and one of epilepsy with Basedow's disease. As regards epilepsy, the object is, by an excision of the total cervical cord and ganglia, to affect the intracranial circulation as a whole. Excision of the superior cervical ganglion (Alexander) destroys the vaso-constrictors of the carotid vascular area, while excision of the inferior ganglion acts in a similar way as regards the vertebral artery. The *raison d'être* of the combined operation is that, in epilepsy, one of the objects to be attained is to secure a modification of the cerebral circulation, to produce and maintain a steady and slight arterial

hyperæmia, so as to improve the nutrition of the nerve-cells and to sweep away toxic substances. While occasional cases operated upon by Jonnesco's method are reported from time to time, no statistics of any number of cases have appeared since Jonnesco's own in 1899. These cases have been too few in number, and too short a time has elapsed, to draw any conclusions calculated to elevate the operation from the domain of theoretical therapeutics to that of sound and practical surgery.

G. J. Winter (*Archiv für Klin. Chir.*, Vol. 67, 1902) has performed total bilateral resection of the cervical sympathetic nerves, according to Jonnesco's technique, in nine cases of essential epilepsy. Five of his cases remained unchanged. Of 122 fully published cases, 67, or 54·9 per cent., were unsuccessful.

Hammond speaks thus of the operation :—"As to the surgical procedure of resection or section of the cervical sympathetic, it is destined to fall into deserved disuse. Many experiments and investigations have been undertaken within recent years, and in the vast majority of instances, even when such workers were willing and desirous of finding good results from the practice of the operation, they report unfavourably to its further trial. Many writers maintain, with apparent justice, that the operation is as little indicated theoretically as practically."

Kocher read an important paper before the Twenty-eighth Meeting of the German Surgical Society, in which he pointed out that early operative statistics of cure (60 to 70 per cent.) were too sanguine, and were the cause of the present scepticism regarding the value of surgical intervention. He believes that "*the* ætiological factor in the production of epileptic convulsions *is focal or general increase in blood-pressure.*" He does not regard scars in themselves, especially aseptic ones, as adequate causes of epilepsy. Kocher strongly advised surgeons to bear in mind the effects of pressure in operative work, both of the affected and remote areas of the brain. He regards pressure as the factor in the status epilepticus. To overcome this, he described a method of dealing with the skull and dura mater. After trephining and removing the bone, he opens the dura by two cuts at right angles to one another, and cuts

away the corners thus formed in order to prevent regeneration of bone and the filling in of the defect in the skull. By this means he substitutes an elastic diaphragm for a rigid box; and this arrangement, he believes, will automatically regulate excesses of intra-cranial pressure. The good results of his operations he attributes to the relief of pressure by the formation of this elastic diaphragm. For the relief of intra-cranial pressure, due to a cyst or fluid in the ventricles, he employs drainage by means of a small silver tube made fast to the opening in the skull, and continued for one or more years.

Pierce Clark (*Medical Record*, 1901) places the question of the surgical treatment of epilepsy very impartially and very concisely before his readers. He emphasises the importance of careful medical treatment before and after trephining, and urges that the rules which govern the selection of cases for operation should be more restrictive than at present even conservative medicine demands. He thinks that if this were done a much better prognosis for recovery would obtain for the traumatic cases than the present 4 per cent. He goes on to say: "From the class of those heretofore supposed to be operable, I would urge that idiopathic epileptics in whom the seizures have a definite form of invasion be withdrawn. True or essential epilepsy frequently takes the Jacksonian form in point of muscular involvement in seizures. Many traumatics probably owe the focalization of their convulsions as little to trauma as the true idiopathics with Jacksonian convulsions. The brain as a whole in such cases is epileptogenic; one zone is only a little more excitable than another. Much disappointment has been experienced by surgeons operating upon these idiopathics disguised as Jacksonian epilepsy."

In cases of Jacksonian epilepsy, with well-marked cranial trauma, where little or no neurotic family history is present, trephining, he thinks, may be done with advantage within two years after the injury and onset of epilepsy. Moreover, in such cases excellent chances of success exist, providing post-operative treatment is persistently followed out. He also urges the lessening of the time between the establishment of the epilepsy and the performance of a successful operation,

according to the prominence of the convulsive tendency or habit. He points out that almost all epileptics have frightful falls, contusions, and lacerations of the scalp in almost daily attacks of their disease, covering a number of years, and that yet the finding of intracranial injury, hæmorrhage, and contusion of brain-substance at autopsies as a result of such accidents is exceedingly rare. From this he argues that in the vast majority of cases in which cranial injury is not in evidence, the trauma could not have been a material excitant of the epilepsy.

Clark also points out the surprising fact that traumatic epileptics often have neurotic family histories quite equal to those of the idiopathic variety. This should not be forgotten, as it materially changes the prognosis of ultimate recovery. He thinks that a neurotic history in Jacksonian epileptics tends to prove that in all epileptics, from whatever initiative, the predisposition is paramount.

Owing in part to the formation of cicatrices, adhesions between membranes and cortex, or other irritation of the cortex following trephining, a fairly large percentage of those trephined are not only not benefited, but are actually made worse by the operation. No known method is yet entirely successful in preventing a re-formation of old adhesions. Various means have been adopted to meet this difficulty, chiefly the plan of introducing between the brain and skull some such material as gutta-percha tissue, oiled-silk protective, or, best of all, a sheet of gold-foil. Kocher frequently re-operates for this condition and for post-operative intracranial pressure.

According to Clark, operating in epilepsy for the relief of intracranial pressure as a primary cause of the convulsions should no longer be practised. The additional pressure is a result of the convulsion and not a cause. Notwithstanding this, Kocher, who has done 12 operations in carefully selected cases, has secured six radical cures. As already stated, he in addition arranges for an after-treatment in the form of cerebral and cranial drainage. Kocher's results were best in the cases showing adhesions between the dura and pia; and with him the more radical the interference, the better the results. Probably much of his success was due to post-

operative bromide treatment and the fact that he selected cases largely with an absence of neurotic history.

Many cases of idiopathic epilepsy in which Jacksonian seizures predominate are due to infantile cerebral palsies previously overlooked. In one class the damage is to the cortex during the process of birth, though the amount of mischief is seldom sufficient to cause the characteristic bilateral motor affection known as "birth-palsy." In another class there occurs a sudden cortical lesion on the surface of the brain during the first two years of life. "These cases are distinguished by the severity of the initial convulsions, by their frequently unilateral character, and by the fact that the slighter fits at a later age distinctly begin on one side and involve this chiefly. Although such cases are essentially different from those of idiopathic nature, the frequently recurring discharges seem to induce a similar state of the brain; and not uncommonly minor attacks appear, quite similar to those of the idiopathic form." (Gowers.)

Freud states that a majority of idiopathic epileptics with Jacksonian phenomena have had infantile cerebral palsy, but in after years no symptom of the palsy exists, except the epilepsy.

Concerning the technique of operations by trephining for relief of epilepsy, absolute asepis is, of course, a first requisite. Large patent openings should be made, no attempt being made to secure any bony occlusion. This is necessary both for the thoroughness of the operation and also to prevent a possible increase of intra-cranial pressure and meningeal adhesions. Large openings are also advantageous in localising the area wanted, as due allowance must be made for individual variation in the positions of the motor areas, as pointed out by Horsley.

Clark summarises the present status of trephining as follows:—

1. Idiopathic epileptics with typical *grand-mal* seizures should never be trephined.

2. Idiopathics in whom seizures are of the Jacksonian type should be trephined only when infantile cerebral palsies can be excluded, and when the family and personal degeneracy is at a minimum. If operation is determined upon in such cases, a very thorough removal of the epileptogenic area should be

made; even then but a fraction of 1 per cent. recover from their epilepsy.

3. Traumatic epileptics may be trephined when the injury is definitely proven; when it stands in direct causal relation to the disease; and when it has existed not more than two years. The prognosis will then largely rest upon the degree of the neurotic predisposition present. The earlier trephining is resorted to after convulsions begin the better the prognosis.

4. All epileptics trephined for whatever cause must be given post-operative bromide treatment for years.

Putnam (*Therap. Gaz.*, October, 1901,) thus views the question of surgical treatment in epilepsy:—"It may be stated as a fact, that would probably be generally admitted, that operations for the relief of focal epilepsy, whether these aim at the removal of local sources of irritation or of diseased areas involving the cortex, are often of unquestionably great benefit, although they have not accomplished nearly all that was hoped of them. This statement is substantiated by recent compilations of German surgeons, as Braun, Graf, and Matthiolus. When it comes to the important question of the comparative merit of cortical excision, as against operations of less magnitude, such as simple exposure of the cortex or loosening of dural adhesions, and the like, which sometimes have an extraordinarily favourable effect, the case is not so clear; especially when it is remembered that the excision is likely to cause lasting incoordination of slight degree, and that the resulting cicatrices may be by no means indifferent for the health of the surrounding parts of the brain. Still, the figures cited by Matthiolus, taken for what they are worth, indicate rather better results from operations in which the brain has been included in the operation than where only lesions of the brain coverings have been treated."

Roswell Park (*American Medicine*, November 1902) concludes an article on the "Surgical Treatment of Epilepsy" with the following summary:—(1) Epilepsy is the last disease to which surgical measures should be indiscriminately applied. In judiciously selected cases, radical operations of various kinds, suited to the individual needs of each case, have given far more satisfactory results than has non-operative or medicinal treatment. (2) Every case must be studied as a

problem by itself. The only general laws applying are those regarding the removal of peripheral or local foci of irritation and the destruction of paths of conduction which convey disturbing impulses. In each case we must decide as to the operative method by which we may meet these indications. (3) In order to obtain the best results patients should be seen early. It would be well to have every epileptic carefully studied by an accomplished surgeon, who should review the case with a view to the possibility of surgical intervention. (4) Operation, when indicated and undertaken, should be regarded as a first measure to be followed, and often preceded, by others looking to a correction of all faults of diet, of elimination, &c. Long-continued attention to these matters is the price of eventual success. (5.) In those cases characterised by blanching of the face, when the seizures can be warded off or mitigated by the prompt use of amyl nitrite, we may consider the propriety of an ex-section of the cervical sympathetic.

Von Bechterew (*Deutsch. Zeitschrift f. Nervenheilk.* Bd. 21, 1902) has operated upon a case of so-called chronic epilepsy, where cramp-like twitchings occurred in various parts of the body before the epileptic attacks. The skull and dura were removed from over the motor region on one side. After testing the irritability of the cortex, small portions of the central convolutions were removed in three places. No signs of paralysis appeared after the operation, and the patient was much improved. A similar operation on the opposite side was unfortunately followed by infection with erysipelas and death.

Catòla (*Rivista di Patologia Nervosa*, May, 1902) reports a case of "partial epilepsy" in which operation confirmed the clinical diagnosis of brain-tumour. As reported by Fielding (*Journ. Nerv. and Mental Disease*) the author's conclusions drawn from the literature of the subject are as follows:—(1) The aura is the expression of a cortical irritation and represents the initial phase of the convulsive seizure; (2) the sensory-motor aura is the symptomatic expression of a stimulus which acts in the territory of the psycho-motor zone; (3) the sensory aura is the expression of a stimulus which acts outside of the psycho-motor zone and constitutes an important aid to the

diagnosis of the site of a lesion located in the corresponding sensory centres or in neighbouring parts; (4) as the aura is, for the most part, the result of a superficial and not very intense stimulus, it probably furnishes a more definite indication of the diseased site than the convulsion itself, which is the result of a more intense stimulus and which carries with it phenomena of diffusion more or less extended and accentuated; (5) in rare instances a lesion capable of provoking convulsive phenomena is located exclusively in the white matter; in these cases it is impossible, during life, to make a differential diagnosis from the strictly cortical forms; (6) of great import is the site in which the convulsion begins, as well as its mode of diffusion; (7) Jacksonian epilepsy is not always the expression of a circumscribed cerebral lesion, but may accompany very diffuse lesions; (8) there are forms of Jacksonian epilepsy, which are due to extra-cerebral stimulus (reflex forms), as well as those which are purely neurotic (hysterical forms); (9) other forms are due to auto- and hetero-intoxication, in which a lesion of the central nervous system is sought in vain; (10) nothing is known of the site of the cerebral lesion in masked partial epilepsy.

At a recent discussion before the Medical Society of London (February 9, 1903) on the Treatment of Epilepsy, Sir Victor Horsley, F.R.S., in a most clear and concise address, set forth the present status of its surgical treatment, and gave to the Society the results of his large experience extending over the sixteen years since he first deliberately operated on a patient to stop attacks of epilepsy. For purposes of discussion he arranged epilepsy under four headings with various subdivisions as shown by the following table:—

1. *Idiopathic.* (No gross lesion.)
   - (*a*) Onset localised. "Focal."
   - (*b*) Onset generalised.
2. *Jacksonian.* (Always gross lesion or traumatism.)
   - (*a*) Traumatic.
     - (i) Generalised convulsion.
     - (ii) Localised convulsion.
   - (*b*) Congenital.
   - (*c*) Neoplastic. (Tumour, abscess, aneurysm.)

3. *Reflex.*
   (*a*) Injury of nerve.
   (*b*) Injury of spine.
   (*c*) A-traumatic cases.

4. *Hystero-epilepsy.*

Sir Victor Horsley then said:—"From a surgical point of view of course it strikes one that epilepsy hitherto has been treated always as a disease, whereas, of course, it is only a symptom; and cases that are brought for purposes of differential diagnosis—possibly resulting in surgical treatment—have always been treated from the point of view that the convulsion was a disease. Under these circumstances it is extremely difficult to classify epilepsy for this discussion. The classification I have ventured to put upon the board, as you will see at once, is a very imperfect one, and is partly causal, partly symptomatic in origin. From the surgical point of view we would desire it to be purely causal. And then we could narrow down the issues for discussion very closely."

He then went on to say that he had no experience whatever of operations and surgical treatment of generalised idiopathic epilepsy; nor could he conceive, from *a priori* considerations, how surgical intervention was likely to benefit this form. The initial event in these cases is total loss of consciousness, and the only clinical parallel to them is a severe concussion of the brain for which surgical intervention could do no good.

Of focal idiopathic epilepsy he gave accounts of five cases upon which, at the request of physicians, he had operated. Two showed gross lesions—one syphilitic, the other tubercular. Two showed no gross lesion, nor were they benefited by operation. The fifth case was a young girl who had a general epileptic convulsion as far as loss of consciousness and the after-effects went, but in whom the spasm was limited to the left facial region. The foot of the right ascending frontal gyrus was exposed and found to be congested. It was removed. The result was that the epileptic habit was not arrested; the patient afterwards had general idiopathic fits, but not in the left facial region. From his own personal experience Horsley concludes that the epileptic habit in general idiopathic epilepsy

cannot be arrested, if once the opposite hemisphere has been brought into an unstable condition.

In speaking of Jacksonian epilepsy he thought those cases which are due to trauma, and which present generalised convulsions, should be considered as belonging to the same condition as generalised idiopathic epilepsy; and that surgery could not do much for them; and this in spite of the fact that he had trephined in two such cases, finding only a chronic congestion and intracranial tension, but yet obtaining a cure of 14 and 8 years respectively. In dealing with traumatic cases of localised convulsion, he pointed out that these were cases of direct injury of the bone, with more or less destruction of it; and almost always with a history of healing by granulation (*i.e.*, a wound which is more or less septic). Concerning the prognosis of these cases, his experience is as follows:—In those affecting the so-called motor region, the complete excision of the scar in the brain, with the unstable brain-tissue immediately surrounding it, will result in cure. Lesions in the frontal region usually present generalised convulsion, always accompanied by Dr. Jackson's "purposive movements," totally different from the ordinary Jacksonian epilepsy from lesions of the motor cortex. Here, while undoubtedly trephining and removing the scar will often diminish attacks, the prognosis is distinctly bad. Of those affecting the sensory region—the occipito-temporal and occipito-parietal—the prognosis is uncertain; not so good as that of the motor region nor yet so bad as that of the frontal lobe. (*See* Figs. 1 and 2.) He sums up the question of prognosis in the following words:—"All cases in the motor region should be operated upon early, and then there will be a very good hope of cure. In the sensory region they should be operated upon also, but there will be less promise of good result. And lastly, in the frontal region, operation may be undertaken, but the outlook is most unfavourable. Of course in all cases I presume that the operation performed is that of excision of the scar and the circumferential damaged brain-tissue."

Regarding the congenital cases, he pointed out that they were very often of a more or less Jacksonian type, becoming generalised, and frequently accompanied by a certain amount

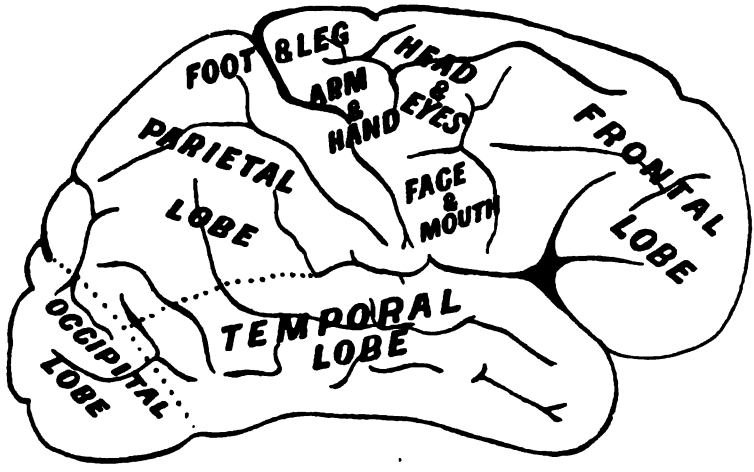


Fig 1. *Diagram to show the lobes and "motor areas" on the external surface of the cerebrum.* (*D. J. A.*)

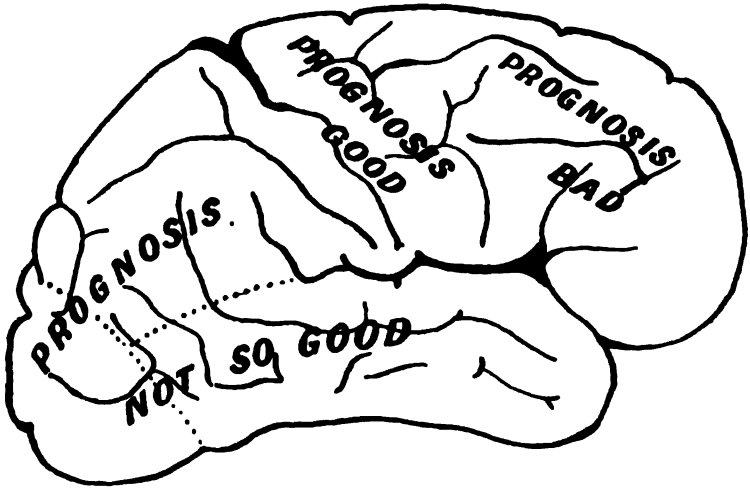


Fig. 2. *Diagram to show the prognosis, as defined by Horsley, in operation for Epilepsy.* (*D. J. A.*)

of hemiparesis or hemispastic paralysis, and want of development or growth, if the patient has gone beyond the early years of life. They are usually due to an injury from birth, producing a porencephalic condition. This occurs most commonly in the parietal region, and in the neighbourhood

of the fissure of Sylvius. These cases, if operated upon while the patients are children, undoubtedly yield very favourable results. In adults, while a diminution in the number of attacks may be looked for, it is scarcely possible to produce absolute cure by surgical intervention, on account of the assumption of the epileptic habit by the opposite hemisphere.

In dealing with neoplastic cases Sir Victor Horsley pointed out that the diagnosis must not be based upon the character of the fit, but upon other circumstances pointing to the existence of a gross lesion. He emphasised the mistake so commonly made of supposing that, because there is a gross lesion of the cortex, the epilepsy must be more or less of the nature of a true Jacksonian fit; and he showed that there are cases in which the fits may be of two distinct classes, viz., a generalised idiopathic fit one week, and a localised Jacksonian attack in another.

Of the reflex cases he had no personal experience of epilepsy due to injury of a peripheral nerve, but had successfully operated upon cases due to injury of the spine. The operation done was that of laminectomy.

The a-traumatic cases were those rare ones published only by Jackson, Densman, and Bruce, in which a touch on the head caused a sudden epileptic convulsion of very brief duration, obviously reflex in type. Horsley, of course, did not propose surgical intervention in these cases. He finally pointed out how reprehensible such operations as ovariotomy were for the attempted cure of hystero-epilepsy, and that, serious as that condition was, he did not think surgery could offer any possible relief from it.

### TUMOURS AFFECTING THE SPINAL CORD.

These may be included under two main headings :—

A. Growths in the vertebral column (i) originating in the structures thereof, either (*a*) primary, or (*b*) secondary; (ii) originating elsewhere, and involving the spine by direct extension.

B. Growths within the spinal canal. These may be (i) extradural, arising (*a*) from the membrane, (*b*) from the tissue between the membrane and the bone, or (*c*) growing into the canal through the intervertebral foramina; (ii) subdural,

arising (*a*) from the surface of the membrane, (*b*) from the arachnoid, (*c*) from the pia mater; (iii) in the cord, arising (*a*) from the pia mater, (*b*) in the substance of the cord, (*c*) in the tissue surrounding the central canal.

The term "tumour of the spinal cord" in the ordinary use of the term means any tumour of any kind that encroaches upon the spinal cord, and so interferes with it functionally and anatomically. The symptoms which a tumour developing from each one of the above structures produces vary somewhat with the original seat of the disease; and this is especially true of the early symptoms; but, speaking generally, the symptoms due to a tumour arising in any of these structures are similar, and depend upon irritation of the nerve-roots and pressure upon the cord itself. It is of great importance, from the surgeon's point of view, to distinguish extra-dural, subdural, and intramedullary growths. Until Abbe recently published a successful case of operation upon an intramedullary tumour, they were supposed to be wholly beyond the reach of surgical procedure. From a clinical point of view, the nature and variety of the tumour are of small importance, seeing that the most benign can produce just as much compression as the most malignant. The symptoms of spinal-cord tumour, named in order of their usual development, are sensory, motor, visceral, and trophic and topical. The two essential points in diagnosis, and yet the most difficult to determine, are: (1) the relation of the tumour to surrounding structures, and (2) at what segment of the spinal cord it is situated. The two chief points in favour of meningeal as opposed to intramedullary tumour are early pain of great severity and limitation of motor implication. A careful and systematic study of the anæsthesia is the most important aid in determining at what segment of the cord the tumour lies. Sir Victor Horsley emphasises very strongly the necessity for exact anatomical knowledge of the position of the spinal nerve-roots and cord-segments. He warns against the danger, always present, of diagnosing the lesion too low. Professor Thane gives the following instructions as an aid in the matter:—"The relations of the origins of the spinal nerve-roots to the spinous processes of the vertebræ vary to some extent in different individuals, especially in the thoracic region, the range of any given dorsal nerve-root being about equal

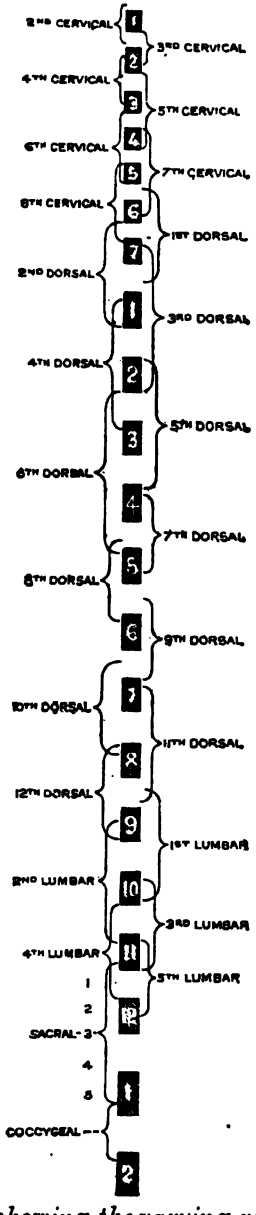


Fig. 3. *Diagram showing the varying relations of root-origins of spinal nerves to the spines of the vertebræ. After R. W. Reid.* (From Quain's *Elements of Anatomy.* Tenth edition.)[1]

[1] For the loan of this illustration we are indebted to the Publishers, Messrs. Longmans, Green, & Co.

to the distance between three adjoining spines, or two interspinous intervals, as is shown in the accompanying diagram, constructed from the observations of R. W. Reid upon six subjects (Fig. 3). The following rules will, however, serve to indicate with sufficient accuracy the average position of the several nerve-roots:—The second cervical nerve arises opposite the neural arch of the atlas, the third opposite the spine of the axis, and the fourth opposite the interval between the second and third cervical spines. The lower four cervical nerves arise each opposite the spine of the second vertebra above the place of exit of the nerve from the spinal canal. The origins of the upper six dorsal nerves are about on a level with the spines of the third, and of the lower six with the spines of the fourth vertebra above their respective places of exit. The lumbar nerves arise in the neighbourhood of the tenth and eleventh dorsal spines, and the sacral nerves between the eleventh dorsal and first lumbar spines."

Collins, in his paper referred to below, says: "The recent experiences of Starr, Oppenheim, and Schlesinger have shown that there is danger of localising the tumour one segment too low, so that in every case of spinal-cord tumour that is submitted to operation the opening should be made over the upper end of the tumour, and if not found, a further opening should be made in an upward, rather than in a downward, direction. The consensus of opinion seems to be that the location of any lesion in the cord is from two to four inches above the uppermost limits of the anæsthesia, and more often the latter figure than the former. The question how many segments of the spinal cord are concerned in supplying any given tegumental area with sensory fibres is not settled. Sherrington, from experimental investigations, believes that three continuous areas are thus concerned, while Bruns, Schlesinger, and others are inclined to the belief that there are five continuous segments. Experience with tumours of the spinal cord inclines one to the latter view."

The favourite location for spinal-cord tumour is in the dorsal region, at either the lower or the upper end. In 70 cases analysed by Collins, 35 were of the dorsal region, 15 of the cervical, 13 of the lumbar and sacral, and 6 of widespread distribution.

Starr found in a collection of cases of spinal-cord tumours that in over 50 per cent. an operation would have been feasible, and according to the pathological report in 75 per cent. the growth could have been removed. Horsley's statistics show that out of 58 cases of tumour of the spinal meninges 20 were extra-dural and 38 intra-dural. Of the former, 5 were sarcoma, 4 lipoma, 4 tubercle, 3 echinococcus, 1 myxoma, 1 fibro-chondro-lipoma, 1 fibrosarcoma, and 1 carcinoma. Of the latter class 12 were instances of myxoma, 7 of fibroma, 7 of sarcoma, 4 of psammoma, 4 of tubercle, 2 of syphilis, and 2 were parasitic.

Williamson, in a critical review on the results of the operative treatment of spinal tumours (*Med. Chron.*, September 1902) reports as follows :—

"As regards the frequency, pathological nature, and situation of spinal tumours, the statistics of Schlesinger furnish information which is of importance in the consideration of operative treatment. In 35,000 post-mortem examinations at the Vienna General Hospital there were 151 cases of tumour of the spinal cord, spinal meninges, and vertebral column ; in 104 the spinal cord was affected, directly or indirectly. Schlesinger estimated that only 150 out of 400 cases recorded in medical literature would have been suitable for surgical treatment.

"According to Schlesinger, tubercle is the most common form of spinal tumour (using the term in its broadest sense), whilst syphilitic gummata are very rare.

"Schlesinger states that the most frequent forms of spinal tumour at different ages are as follows :—

| —— | Intra-Medullary. | Extra-Medullary. |
|---|---|---|
| Under 10 years - - | Tubercle - - - | Lipoma or sarcoma. |
| From 10 to 20 - - | Tubercle and glioma - | Multiple and metastatic sarcoma, and hydatid cysts. |
| „ 20 „ 40 - - | Tubercle and glioma - | Sarcoma and hydatid cysts. |
| „ 40 „ 60 - - | Gumma and tubercle - | Solitary sarcoma, psammoma. |

"According to Schlesinger, tumours of the vertebra with consecutive implication of the spinal cord are considerably more frequent than all meningeal and intramedullary spinal tumours together. The relation of meningeal to intramedullary spinal tumours he estimates as 7 : 3, or 6 : 4."

Williamson then shows the nature of meningeal tumours and their situation in the following table of 110 cases, 58 of which he has taken from the paper by Sir William Gowers and Sir Victor Horsley, and 52 of which he has collected since that paper was published in 1888.

| — | Extra-dural. | Intra-dural. | Total. |
|---|---|---|---|
| Sarcoma | 18 | 10 | 28 |
| Hydatid cyst | 15 | 1 | 16 |
| Myxoma | 1 | 12 | 13 |
| Tubercle | 4 | 4 | 8 |
| Fibroma | 1 | 11 | 12 |
| Fibro-myxoma | 0 | 1 | 1 |
| Fibro-sarcoma | 3 | 1 | 4 |
| Fibro-myxo-sarcoma | 0 | 1 | 1 |
| "Connective tissue" tumour | 2 | 0 | 2 |
| Psammoma | 0 | 8 | 8 |
| Lipoma | 5 | 0 | 5 |
| Fibro-chondro-lipoma | 1 | 0 | 1 |
| Endothelioma | 2 | 0 | 2 |
| Myeloma | 1 | 0 | 1 |
| Exostosis | 1 | 0 | 1 |
| Lymphangioma | 1 | 0 | 1 |
| Chondro-sarcoma | 1 | 0 | 1 |
| Carcinoma | 2 | 0 | 2 |
| Syphilitic gumma | 0 | 2 | 2 |
| Cysticercus | 0 | 1 | 1 |
| | 58 | 52 | 110 |

In the 53 cases of operation for spinal tumour which Williamson has collected since 1887, the nature and situation of the tumour is shown by his table here given :—

| — | Extra-dural. | Intra-dural. | Total. |
|---|---|---|---|
| Sarcoma | 13 | 3 | 16 |
| Hydatid cyst | 12 | 0 | 12 |
| Psammoma | 0 | 4 | 4 |
| Fibroma | 1 | 4 | 5 |
| Fibro-myxoma | 0 | 1 | 1 |
| Fibro-sarcoma | 2 | 2 | 4 |
| Fibro-myxo-sarcoma | 0 | 1 | 1 |
| "Connective tissue" tumour | 2 | 0 | 2 |
| Endothelioma | 2 | 0 | 2 |
| Myeloma | 1 | 0 | 1 |
| Exostosis | 1 | 0 | 1 |
| Lymphangioma | 1 | 0 | 1 |
| Lipoma | 1 | 0 | 1 |
| Chondro-sarcoma | 1 | 0 | 1 |
| Cancer | 1 | 0 | 1 |
| | 38 | 15 | 53 |

And the nature of the lesions in the successful cases he tabulates thus :—

| — | Extra-dural. | Intra-dural. | Total. |
|---|---|---|---|
| Hydatid cyst | 5 | 0 | 5 |
| Fibroma | 0 | 3 | 3 |
| Fibro-myxoma | 0 | 1 | 1 |
| Fibro-sarcoma | 2 | 1 | 3 |
| Fibro-myxo-sarcoma | 0 | 1 | 1 |
| "Connective tissue" tumour | 2 | 0 | 2 |
| Psammoma | 0 | 2 | 2 |
| Exostosis | 1 | 0 | 1 |
| Sarcoma | 4 | 1 | 5 |
| Lymphangioma | 1 | 0 | 1 |
| | 15 | 9 | 24 |

Williamson then concludes his valuable paper with the following remarks :—"The cases here tabulated show that spinal surgery may occasionally give brilliant results in certain

tumours of the spinal cord. Probably the proportion of successful to unsuccessful cases is very small, since so many of the latter have not been published. It may be pointed out that the cases likely to be benefited will be very few, since spinal tumour is a rare disease, and only tumours of certain forms and in certain situations are likely to be removed with permanently successful results.

As regards the nature of the growth, success may be expected in cases of fibroma, fibro-myxoma, psammoma, lymphangioma, exostosis, and perhaps also in fibro-myxo-sarcoma and fibro-sarcoma. Also hydatid cysts (as shown by the table on page 545) may be expected to be removed successfully when the diagnosis is made early."

Horsley (Allbutt's *System of Medicine*, Vol. VI.) discusses the causes of compression of the spinal cord and their nature under the heads of—(1) the extrinsic; (2) intrinsic; the plane of separation being the dura mater, or theca, of the cord. Under the extrinsic, or extra-thecal, sources of compression, he places:—(*a*) Tubercular disease or caries of the spine, having three chief seats of origin:—(i) just beneath the vertebral bodies at their articular surfaces; (ii) the cancellous tissue of the laminæ, and, subsequently, the periosteum; (iii) the perithecal tissue, probably secondary to mischief in the bone. (*b*) Caries sicca, "a progressive rarefactive osteitis in which the enlarged spaces in the bone are filled with a deep-red granulation tissue, the microscopical appearances of which resemble those of a small spindle-celled sarcoma." (*c*) New growth arising from the periosteum, or the substance of the bone. (*d*) Trauma, leading to compression in one of the following ways:—(i) Separation of contiguous bodies of the vertebræ combined with fracture or subluxation—where such subluxation is possible—of the articular processes of the vertebræ, with the effect of allowing the relative positions of the vertebræ to be distorted, and so to cause a narrowing of the neural canal. (ii) Crushing of the body of one vertebra, combined with fracture of the laminæ and articular processes, so that the cord is compressed by the sharp edge of the body of the lower vertebra projecting into the neural canal, the upper part of the spine being displaced forwards. (iii) Displacement of an inter-vertebral disc, which may be squeezed backwards from its normal position between the

damaged bodies. (iv) Hæmorrhage. Concerning this as a cause Horsley adds: "Though it might be expected that, in view of the rich vascular supply of the perithecal tissue, free hæmorrhage in the neural canal, as a direct result of trauma, would be common, such is not the case; and though intra-thecal traumatic hæmorrhage is sometimes severe in its effects, and intramedullary hæmorrhage always so, perithecal bleeding is not, practically speaking, a source of compression." (v) Aneurysm, causing erosion and collapse of the bodies of the vertebræ, and occurring most commonly in the lower half of the dorsal region. (vi) Parasitic disease. Echinococcus cysts may invade the neural canal through the intervertebral foramina, or cause a certain amount of erosion of the bodies of the vertebræ. The pressure is always very severe, and the consequent destruction produced in the cord is comparatively slowly recovered from after laminectomy has removed the cause.

It is interesting at this point to refer to "A Case of Spontaneous Subarachnoid Spinal Hæmorrhage in a Bleeder," reported by Dr. Edward G. Janeway (*Med. Record*, December 6, 1902). The patient was a young man, who, while apparently recovering from a slight attack of influenza, fell to the floor, and upon examination it was found that there was a complete loss of power and sensation of the legs and lower portion of the body. The onset and character of the symptoms, a rigidity of limbs occurring on bending the body, led to the probable diagnosis of spinal hæmorrhage in a hæmophilic. The fact was elicited that the patient's brother was a bleeder, and had lost the sight of one eye from a retinal hæmorrhage. The patient died at the end of two weeks from gradual ascending paralysis. An autopsy showed a hæmorrhage filling the subarachnoid space, and extending up to the middle cervical region. There was also some blood between the dura and arachnoid, due to a small rupture in the arachnoid membrane over the cauda equina. If this patient had not been a bleeder, Dr. Janeway said, an operation would have been advised. He said he had never seen or heard of a similar case.

In a paper read before the Neurological Society of New York, November 1902, Dr. Joseph Collins discusses some noteworthy cases, and reviews the present status of the

treatment of spinal-cord tumours. He is of the opinion that they are more susceptible to surgical treatment than brain-tumours, and a greater percentage of recovery results from operative interference. Nevertheless, he holds that the majority of spinal-cord tumours prove fatal, and must continue to do so for three reasons: (1) inability to diagnose and localise them; (2) the nature and extent of their growth, which makes them inaccessible or inoperable; and (3) because of the risk to life from the operation. He has collected from the literature the cases published during the last six years, and concludes a most interesting paper as follows :—

"I quote the history of 70 cases. Surgical operation was undertaken in 30 cases. The results of the operation in these 30 cases were as follows: Successful in 12 instances, partially successful in 8, and wholly unsuccessful in ten cases. The operation was considered successful when there was cessation of pain and recovery of motor power; partially successful when there was relief from pain, cessation of progress of the case, and slight regain of motor power; unsuccessful when followed by a death within a few weeks. The nature of the tumour is not stated in the reports of all of the operated cases, but so far as could be determined there were 6 fibroma, 12 sarcoma of one kind or another, 3 endothelioma, and 1 myolipoma. Those cases that succumbed soon after the operation were made up largely of those in which the tumour was a sarcoma, although the patient with myolipoma died from sepsis. All of the cases in which the tumour was found to be a fibroma, recovered with one exception, that of Starr, who also died of sepsis. The cause of death as given in 9 of the cases that terminated fatally was sepsis and septic meningitis, 4 cases; collapse and exhaustion, 2 cases; shock and hæmorrhage, 2 cases; and pneumonia, 1 case.

"If we add to this list the 14 cases which the autopsy records show might possibly have been successfully operated upon if the diagnosis had been made, we find that 44 out of 70 cases of intraspinal tumours might have been treated surgically, *i.e.*, 44 cases were operable. This is an extremely high percentage in comparison with the operability of brain tumours. It is not so high, however, as that given by Starr, who was of the opinion in 1895 that 75 per cent. were

operable. My own belief is that the operability of spinal-cord tumours is considerably less than the percentage which my statistics seem to give. When we look into the record of the cases that are considered operable, we see that in a number of them, not only the size and location of the tumour found *post mortem*, but their nature puts many of them in the list of inoperable. Of the 14 cases 10 were some variety of sarcoma, three glioma, two endothelioma, and one psammoma. In reality there is none of the variety that surgeons have removed most successfully. On the other hand, the variety which is most frequently unsuccessful in the surgeon's hands, sarcoma, predominates. Although the neoplasms might have been removed, it does not at all follow that the operation would have been successful. In 26 cases the tumour was wholly beyond the scope of operation.

"That the operation for removal of spinal-cord tumour is, however, fast growing in favour is shown by the number of instances in which it has been undertaken during the last five years. Starr stated in 1895 that he was able to find record of 123 cases, and in these operation had been undertaken 22 times, while in the 70 cases that I have collected it had been undertaken 30 times.

"*The Results of Operation for Spinal-Cord Tumour.*—It is not an easy matter to answer the question, 'What may be expected from operative interference in the treatment of intraspinal tumours, *i.e.*, What is the status of operative surgery in the treatment of these tumours?' If one were to base his opinion upon the published reports of Schultze, for instance, he might easily maintain that the surgical treatment of spinal-cord tumours was extremely successful; on the other hand, such an experience would be considered as evidence of good luck by another whose experience had been very different. Basing the statement upon the reports of cases operated upon, and those that have come to autopsy, without operation, it may be said that 50 per cent. of intraspinal tumours are operable, and of this number one-third to one-half are benefited by operation. Spinal-cord tumours are, therefore, twice as operable as brain tumours are, and the results of operation are twice as successful. When the surgeon so perfects his technique that he can perform the operation for spinal-cord

tumour without development of sepsis, the percentage of cases benefited by operation will be much greater. For instance, the cases reported by Oppenheim, Starr, and Fraenkel recovered from the operation, but they died from sepsis.

"Schultze has recently given a synopsis of eight cases of spinal-cord tumour. In two the diagnosis was erroneous, in the other six, all of which were operated upon, three recovered, two completely, and one partially. In two death followed the operation. In one of the cases in which death resulted there was a large tumour at the level of the cauda equina; in the second there was annular tumorous thickening of the dura, which could not be removed.

"When one considers the hopelessness of these cases when treated medicinally, it will readily be seen that surgical interference is the only thing. The result of surgical treatment has been such as to encourage us in the belief that continuance of effort in the same direction will be followed by a greater degree of success. This view is, probably, generally accepted. The urgency in the treatment of these cases is that they be diagnosticated and operated upon early, *i.e.*, before inflammatory, œdematous, anæmic, necrotic, or degenerative changes that are irreparable have gone on in the spinal cord. If the operation is delayed until these have occurred, the cord's activities cannot possibly be restored. Nothing is more pernicious, it seems to me, than delay after diagnosis of the tumour has been made, in order that medical treatment, particularly iodide or arsenic may be tried. Gumma of the cord rarely produces the symptom-complex of spinal-cord tumours, and if one should mistake occasionally a gumma for spinal-cord tumour and submit the patient to an operation, nothing possibly can be lost. The degree of recovery after operation will, of course, stand in direct relationship to the condition of the spinal cord, and this agrees rather constantly with the duration and intensity of the symptoms. If paraplegia has existed for several months, for instance, and if trophic symptoms of the skin and muscles have appeared, the surgeon may be able to remove the tumour, but all that can be expected by the patient is that the disease will stop progressing.

"Another question that frequently arises after operation is, 'To what degree may improvement be expected to result in

a case that has not shown much result in the recovery of function in two or three months after the operation ?' To this question a negative reply must be given. Examination of the published cases shows that if improvement does not follow soon after the operation, it does not occur to any considerable degree at all. It must at once be added, however, that in many cases there is immediately after the operation an accession of paralytic phenomena which are not to be attributed to changes produced in the cord by the tumour itself, but are secondary to the trauma of the operation. These, as a rule, disappear.

"Delay in operating is responsible for the slight beneficial results that have followed operation in some cases. This cannot be laid at the door of operation however. It is possible also that had some of the cases of sarcoma been operated upon early, *i.e.*, before the tumour had reached such considerable growth, the outcome would be different.

"Taking everything into consideration, it may be said that the surgical treatment of spinal-cord tumours offers the most attractive field for surgical interference of all diseases of the nervous system. Still a word must be said about the inadequacy of surgery in these cases. Patients nowadays die from sepsis after the operation about as frequently as they did 10 years ago. The operation seems just as prolonged as it did formerly, and the loss of blood is oftentimes very great, and in some cases—flat sarcoma—not easily controlled. Until the surgeon overcomes some or all of them, it cannot be admitted that the majority of spinal-cord tumours can be operated upon with prospect of success."

# Public Health.

## THE INFECTIVITY OF THE LATER STAGES OF SCARLET FEVER, AND HOSPITAL ISOLATION.

By LOUIS C. PARKES, M.D., D.P.H.,
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FOR one reason or another the old-established opinion that scarlet fever is highly infectious in its later desquamating stages is being set aside, and the view that late desquamation is not infectious *per se* is gaining ground amongst medical superintendents of fever hospitals and medical officers of health. The following are some of the reasons for the change of view above noted:—(1.) Desquamation of cuticle is not a manifestation of only one disease, scarlet fever. It is undoubtedly more marked and more complete in this disease than in measles or rötheln; but desquamation of a similar character is not uncommon in the latter diseases, and it has never been considered that the desquamation of measles and rötheln was of a specially infective character. (2.) The similarity between scarlet fever and diphtheria—diseases of which the mortality-records were not separated by the Registrar-General until the year 1859—seems to point to an infective organism for the former, similar in character to that of the latter. In each disease the tonsils and soft palate are the parts which usually present the first symptoms: and they may be regarded as actually the organs first invaded by the organism. The tonsillar and buccal mucus is the home of the diphtherial contagion, and it would seem probable that the same secretion is the ordinary habitat of the scarlet-fever virus. (3.) Fever-hospitals, which have lately taken to discharging scarlet-fever convalescents before all traces of desquamation have disappeared, have not shown any increase in the proportion of "return" cases, as compared with their own previous records, or with the records of institutions which still detain their patients until all peeling has ceased. The so-called "return" cases are the cases occurring in a house to which a hospital scarlet-fever patient has recently returned. They are not, of course, always consequent upon, or "secondary" to, the returned hospital patient. Of recent

years "return" cases seem to have formed about 3 per cent. of the admissions to the Metropolitan Asylums Board hospitals.

Until bacteriologists have definitely isolated a specific scarlet-fever organism, researches into the bacterial flora of desquamating scarlatinal cuticle are not very convincing. The *Streptococcus scarlatinæ* of Klein—the organism isolated in 1885 from the Hendon cows, which were believed to be causative of the Hendon scarlet-fever outbreak—has not been found by Klein in human desquamating scarlatinal cuticle at any stage of the disease.

Administrative points of much importance are associated with this question of the infective period of scarlet-fever. Year by year all over the country, but especially in the large towns, an increasing proportion of scarlet-fever patients, mostly children, are being sent to, and treated free of charge in, rate-supported hospitals. The modern fever-hospital is designed and built on the most approved principles, and is adequately staffed and administered. It is altogether an admirable institution, but expensive to construct and maintain. Notwithstanding the increasing numbers of scarlet-fever patients thus isolated year after year at the public expense, there is no satisfactory evidence of any general decline in prevalence of scarlet-fever throughout the country. In various localities the prevalence waxes and wanes from year to year, but it is impossible to say that the disease is a diminishing one. The mortality which the disease causes, however, is a different matter, as the following tables show :—

ENGLAND AND WALES.[1]

Annual Death-Rate per Million in Decennia.

| Periods. | Scarlet Fever. | Diphtheria. | Measles. | Whooping-Cough. |
|---|---|---|---|---|
| 1851-60 - | 982 | | 412 | 505 |
| 1861-70 - | 971 | 187 | 443 | 530 |
| 1871-80 - | 719 | 121 | 379 | 513 |
| 1881-90 - | 338 | 163 | 441 | 451 |
| 1891-1900 - | 158 | 262 | 414 | 378 |
| 1901-2 - - | 138 | 250 | 328 | 292 |

[1] From *Sixty-third Annual Report of Registrar-General.*

## LONDON.[1]

### Annual Death-Rate per Million in Decennia.

| Periods. | Scarlet Fever. | Diphtheria. | Measles. | Whooping-Cough. |
|---|---|---|---|---|
| 1851–60 - | 1,017 | | 530 | 877 |
| 1861–70 - | 1,133 | 179 | 576 | 882 |
| 1871–80 - | 600 | 122 | 510 | 815 |
| 1881–90 - | 335 | 259 | 636 | 693 |
| 1891–1900 - | 188 | 500 | 583 | 500 |
| 1901–2 - - | 126 | 277 | 473 | 382 |

### PERCENTAGE INCREASE or DECREASE in MORTALITY in 1891–1900, and in 1901–2, as compared with 1861–70.

| Periods. | Scarlet Fever. | | Diphtheria. | | Measles. | | Whooping Cough. | |
|---|---|---|---|---|---|---|---|---|
| | England and Wales. | London. | England and Wales. | London. | England and Wales. | London. | England and Wales. | London. |
| 1891–1900 - | −84 | −83 | +40 | +180 | −7 | +1 | −29 | −43 |
| 1901–2 - | −86 | −89 | +34 | +55 | −26 | −18 | −45 | −57 |

[1] From *Sixty-third Annual Report of Registrar-General.*

These tables show the immense reduction in scarlet-fever mortality in recent years, as compared with the decennium 1861–70, when scarlet-fever and diphtheria mortality were first distinguished in the registers of deaths. The reduction has been steady and gradual in the case both of the whole country and of London, which is taken as a type of an urban population. In the case of diphtheria, however, there has been a large increase in mortality in recent years, especially in London and in other large towns, as compared with 30 or 40 years ago. Measles-mortality has remained nearly stationary

during the past 40 years, whilst there has been a considerable reduction in the death-rate from whooping-cough, but not nearly so great as in that of scarlet fever.

The year 1890 is the first complete year for London notifications, notification having been made compulsory in November 1889. In the first six years (1890–5) 128,921 cases of scarlet-fever were notified, equivalent to a case-rate per

SCARLET FEVER IN LONDON, 1890–1902.

| Year. | Cases Notified. | Fatality of Notified Cases. | Percentage of Admissions to M.A.B. | Fatality of M.A.B. Cases. |
|---|---|---|---|---|
| 1890 - - | 15,330 | 5·7 per cent. | 42·8 | 7·8 per cent. |
| 1891 - - | 11,398 | 5·1 ,, | 46·8 | 6·2 ,, |
| 1892 - - | 27,095 | 4·3 ,, | 48·8 | 6·4 ,, |
| 1893 - - | 36,901 | 4·3 ,, | 39·7 | 6·2 ,, |
| 1894 - - | 18,440 | 5·2 ,, | 63·9 | 6·2 ,, |
| 1895 - - | 19,757 | 4·2 ,, | 58·2 | 5·2 ,, |
| 1896 - - | 25,647 | 3·7 ,, | 62·6 | 4·2 ,, |
| 1897 - - | 22,848 | 3·4 ,, | 67·0 | 4·1 ,, |
| 1898 - - | 16,894 | 3·4 ,, | 73·2 | 4·1 ,, |
| 1899 - - | 18,089 | 2·2 ,, | 74·3 | 2·7 ,, |
| 1900 - - | 13,800 | 2·6 ,, | 75·2 | 3·0 ,, |
| 1901 - - | 18,381 | 3·2 ,, | 78·9 | 3·8 ,, |
| 1902 - - | 18,246 | 3·1 ,, | — | — |

10,000 of population of 50·1. In the last six years (1896–1901) 115,569 cases were notified (case-rate 43 per 10,000). In the former period, however, 1893 was a year of exceptional epidemic prevalence, with no counterpart in the later period. Having regard to all the facts, it certainly does not appear that scarlet-fever in London is undergoing any diminution in its prevalence, when considerable periods are passed under review; and the same probably holds good for the entire country. That the type of the disease has changed,

however, is generally recognised, the disease assuming as a rule a much milder form than was commonly displayed, even 10 or 15 years ago.

The table shows the reduction in fatality both of all London notified cases and of cases admitted to the Metropolitan Asylums Board hospitals, since the year 1890. The discrepancy between the fatality of all notified cases and the fatality of Metropolitan Asylums Board cases is seen to diminish gradually from 1890 onwards, *pari passu* with an increase in the percentage of admissions to Metropolitan Asylums Board hospitals. This would be accounted for by the increasing number of mild cases received into hospitals, as the advantages of hospital isolation and treatment became more fully recognised.

In the four years 1886–1889 the fatality of Metropolitan Asylums Board cases varied between 8·8 and 9·9; whilst prior to 1888 the fatality of 25,788 Metropolitan Asylums Board cases treated in the preceding years was 10·85. These cases, however, it must be recollected, were practically poor-law cases, and not a selection of cases from all classes of life as at present; for it was not until 1887 that cases were admitted to the Metropolitan Asylums Board hospitals on the certificate of any registered medical practitioner. In 1887 this certificate to gain admission to hospital had to be accompanied by an order from a relieving officer. The latter requirement, however, was very shortly afterwards abandoned, and the hospitals became free to all sufferers duly certified to be suffering from scarlet fever.

The above-stated figures tend to show (1) that the death-rate from scarlet-fever at the present time is only about one-eighth of what it was 40 or 50 years ago; (2) that diphtheria now causes nearly twice as many deaths as scarlet-fever, whilst measles and whooping-cough cause more than twice as many; (3) that the lowered death-rate from scarlet-fever is not due to a lesser prevalence, but to a change of type, the disease now being of a much milder character than formerly; (4) that the fatality at the present time is between 3 and 4 per cent. of notified cases.

There is no evidence that the increased isolation of scarlet-fever patients in hospitals has caused any diminution in the

prevalence of the disease; nor is there any evidence that it has caused any increase. That the diminished fatality of the disease is due to natural causes operating apart from increased isolation in hospitals, is clearly shown by the London figures, where diminution in fatality preceded, and did not follow, increase in hospital isolation. Moreover, the persistent diminution in death-rate from decennium to decennium, prior to any general hospital isolation, without any known decrease of prevalence, otherwise negatives such a supposition.

Having regard to these facts and to the large sums annually expended out of the rates for the erection and maintenance of hospitals for the isolation and treatment of scarlet fever, the question arises whether the money so expended in isolating sufferers for long periods (average detention in Metropolitan Asylums Board hospitals in 1901 was sixty-seven days) from a disease which out of every hundred attacks only causes three or four deaths, could not be put to a better use—for instance, by the construction and maintenance of open-air sanatoria for the treatment of early cases of pulmonary tuberculosis. In considering this question two facts should be borne in mind, mamely—(1) That it is generally believed that hospital isolation of scarlet-fever cases has so far failed to exert any appreciable influence over the prevalence of the disease, although it is possible that satisfactory evidence of some control may later on be forthcoming; (2) That a majority of scarlet-fever cases at the present time do not require hospital treatment, as do cases of diphtheria or enteric fever, for the benefit of the sufferers themselves, the large majority of scarlet-fever cases being of such a mild character, that they can be well treated at home.

Considered in this light, it might be thought that hospital isolation of scarlet fever was unnecessary; yet most sanitarians would be decidedly adverse to abandoning at the present time *in toto* the present system of hospital isolation of this disease. The public still have a dread of it — a mental attitude bequeathed from the time when scarlet fever was a very serious complaint for most of those who were attacked. Moreover, the public mind is still saturated with the belief that the "peeling" stage of scarlet fever is the most infectious period of the illness. Much harm would accrue to the labouring

population in loss of wages and neglected education of their children, if scarlet-fever hospitals were shut up, as neither employers nor schools would permit attendance from an infected house until a medical certificate of freedom from infection could be obtained.

There are probably not many medical practitioners who would care at the present time to give such certificates, until desquamation had ceased. It would certainly not be wise to ask them to do so. It is only reasonable, however, that medical practitioners should permit the medical superintendents of fever hospitals to have for a time a free hand in this matter. If the profession will agree to abandon its belief in the infectivity of the later desquamating stage of scarlet fever, there are many medical superintendents who will undertake to shorten the detention in hospital of uncomplicated cases; a marked reduction will soon be effected in the average duration of stay in hospital; the ratepayers will benefit in a saving of the cost of maintenance; and the public will gradually be educated to take a view more consonant with the trend of modern scientific opinion than the attitude with which it is now credited.

There is another reason why reform in administration is preferable to abandonment of the system. Scarlet fever has been undergoing a gradual transformation of type, from severe to mild, during the past half century. There is a possibility of the continuance of this progressive decrease in severity until the disease becomes as little fatal as, say, chicken-pox. In that case, hospital isolation would probably be abandoned as an unnecessary procedure for a trifling ailment. There is, however, also the possibility of a recrudescence of severity of type to be taken into account. This might occur at any time, and might be much more rapid than the previous decline. In such an event, the public would quickly demand the provision of hospitals for isolating the sufferers—a demand which would have to be met, even it only a short time previously these institutions had been dismantled or been converted into use or other purposes.

# Reviews of Books.

*A Manual of Medical Treatment or Clinical Therapeutics.* By J. BURNEY YEO, M.D., F.R.C.P., Emeritus Professor of Medicine in King's College, London; Consulting Physician to King's College Hospital, &c. New and Revised Edition. London: Cassell & Co., Ltd. 1902. In two vols. Illustrated. 21s. nett.

THE appearance of a new edition of Dr. Burney Yeo's Manual of Treatment must be a matter of satisfaction to many a busy practitioner. New methods and new drugs are poured upon the profession nowadays in such bewildering profusion that few of us can find time to investigate the claims of each new-comer; and a work which gives within a reasonable compass the supposed advantages and the actual results, satisfactory and unsatisfactory, of therapeutic methods old and new, is a valuable addition to our library.

The new edition has been carefully revised and, whilst unaltered in its general plan, contains the most recent advances in therapeutics in the widest sense of the term. Although the work deals, of course, mainly with medical treatment, the value of surgical treatment and its most recent developments are by no means neglected. For instance, under the head of gastric ulcer, gastro-enterostomy is now included as a curative measure; the treatment of dilatation of the stomach by surgical measures is also considered, and the much-vaunted success of operative treatment in tubercular peritonitis is more fully discussed. One could wish that the author had devoted even more space to this last procedure, and had obtained some more satisfactory statistics as to results. At present we fear that it is scarcely possible to obtain more than *ex cathedra* statements on both sides; and if we might add one more, arising out of a not inconsiderable experience of both methods of treatment, medical and surgical, we should not only reiterate the statement to which the author alludes, that in the plastic form of tubercular peritonitis operative

treatment is "useless and worse than useless"; but should go further and say that even in the ascitic form it is extremely rare that laparotomy is advisable or even justifiable.

An interesting addition to the chapter on diseases of the stomach is a section on "Modern Gastric Methods," and we cannot forbear from quoting one remark which Dr. Burney Yeo makes, after mentioning such terms as "Achylia Gastrica, Hyperchlorhydria, Gastrosuccorrhœa" *et hoc genus omne!* "We must here, as elsewhere, be on our guard against the growth of mere phraseology, with which, to our thinking, medical science is already gravely overladen."

If *sesquipedalia verba* were the only symptom of modern gastric methods, we should feel less disturbed at the awful results which might accrue from a visit to the specialist therein. No doubt there is something picturesque in the idea of a "stomach-bucket" lowered into one's chief organ of digestion and hauled up a little later with a sample of one's last meal; it is comforting also to know that one has only to swallow a few trifles in the way of scientific apparatus, and any misbehaviour on the part of one's gastric peristalsis can be registered at once by the gastrograph or seen by gastrodiaphany; but when it comes to swallowing a "deglutable stomach electrode," or a neat little gastric spray, or even a complete massage apparatus (the "gyromele"!), we confess to a rooted determination to avoid the stomach-specialist (or should it be "stomach-quack"?). We are glad to see that Dr. Yeo himself expresses no approval of "these mechanical methods of treating the long-suffering stomach."

The chapter on appendicitis is practically re-written, and not the least valuable part of the extremely interesting account of its treatment is the protest against the *fièvre opératoire* which has been made by such authorities as Broca and Treves. At the present time we venture to think that indiscriminate and hasty operative interference in appendicitis calls for some protest, and we shall do well to bear in mind the statement quoted from Sir Frederick Treves that "the number of cases which undergo spontaneous cure form an overwhelming majority and cannot be lost sight of."

The therapeutic value of yeast is one of the recent observations which finds a place in this new edition; in the

gastroenteritis of infants it has been given by the mouth and by the rectum with good results; it has been used also in malignant endocarditis; and its products, nuclein and nucleinic acid, have been used in tuberculosis by hypodermic injection. One cannot fail to be struck by the increasing use of hypodermic, intramuscular, or intravenous medication in all sorts of diseases. Surely in most cases it is an absolutely unnecessary infliction of pain, and also an addition of risks to those already present in the disease.

A significant change has been made in the chapter on Tuberculosis, where hygienic and sanatorium treatment now takes precedence of drugs. A useful list of sanatoria has also been added, and the latest drugs, useful and useless, are considered.

Amongst other additions we notice a section on cerebral tumour in which surgical treatment is discussed; and it is satisfactory to find that stress is laid on the exceedingly doubtful value and the by-no-means-doubtful risks of lumbar puncture—points which might usefully have been emphasised again in the chapter on meningitis.

The pages devoted to the treatment of Paralysis agitans, Rickets, Scurvy, and Erysipelas are all new matter, and with many other improvements, make this edition even more valuable than those which preceded it. Dr. Burney Yeo's work is, of course, chiefly a compilation: he does not make himself responsible for any advocacy of most of the methods which he mentions; he leaves the reader to form his own opinion, and only occasionally refers to satisfactory results obtained by himself, or expresses approval or disapproval of the methods described.

No one can read this admirable work and compare it with previous editions without realising how large a proportion of the boasted cures and new-fangled drugs pass with well-deserved speed into the limbo of the forgotten. The history of therapeutics, indeed, as shown in successive issues of such a work, is a melancholy record of hasty generalisations and exaggerated claims—if, indeed, misrepresentation and self-humbug be not more suitable terms—ending in disappointment and disuse.

Dr. Burney Yeo repeatedly warns against these tendencies

in therapeutics, and in including many almost disused methods does good service in recording their failure. But it is not all failure, and the author is to be congratulated on placing so clearly and concisely before his readers the real progress which has been made in clinical therapeutics during the last few years.

*Transactions of the Association of American Physicians.* Vol. XVII. Philadelphia. 1902.

THIS volume of *Transactions* contains a number of papers of great interest. Many of them are of a highly technical nature, appealing to bacteriologists alone, such as those of "Acid-resisting Bacteria," by Drs. Abbott and Gildesleeve, and the group of papers dealing with the "Study of Bacterial Cells" by several writers. Three articles of general interest are those dealing with Osteitis deformans by Drs. Prince, Fitz, and Fussell. The book contains many excellent illustrations, some of them in colours, and forms a valuable contribution to pathology and clinical medicine.

*Guy's Hospital Reports.* Vol. LVII. Edited by J. H. BRYANT, M.D., and F. J. STEWARD, M.S. London: J. and A. Churchill. 1902.

THE volume before us well maintains the reputation of *Guy's Hospital Reports.* It contains a very interesting article by Dr. Hale White on "The Pathology of Acute Rheumatoid Arthritis"; one by Messrs. A. D. Fripp and R. H. Jocelyn Swan on "A Case of Sarcoma of the Tongue," with an analysis of previous cases of this condition; an article on "The Gelatin Treatment of Aneurysm," by Dr. Claxton, which we have already referred to elsewhere; and a paper of some importance on the "Effect of Muscular Work on the Temperature of the Body," by Drs. Pembrey, Arkle, Bolus, and Lecky. Dr. E. I. Spriggs writes on the excretion of urea and uric acid on an excessive diet, and Drs. Butler and French on metabolism in a case of diabetes insipidus following fracture of the skull. These by no means exhaust the list of important contributions.

*Selected Essays and Monographs, chiefly from English Sources.* (BRAXTON HICKS; BODINGTON; HODGKIN; PAGET; HUMPHRY; EHLERS.) London: The New Sydenham Society. 1902.

IN view of the great interest now taken in the open-air treatment of consumption the reprinting of Bodington's original essay on this subject is particularly opportune. The claims of our countryman to the discovery of this life-saving method might otherwise tend to be overlooked. It is curious to contrast the wisdom of the practical advice as to treatment given in this essay with the pathological basis on which it is supposed to be founded, or at least is theoretically justified by its author. The tubercular process is attributed by Bodington to the destruction of the terminations of the nerves in the affected part, and he gives, as an example proving this, the experiment by Majendie of dividing the orbital branch of the fifth nerve, and the resulting inflammation of the eyeball. On the theory that a restoration of nerve-influence to the eye might have preserved its integrity, he holds that the object of treatment in phthisis is to strengthen the pulmonary nerves, and that this is best done by open air. This affords a good instance of the extent to which practice is wont to outstep theory in the field of medicine. The other papers included in the present volume are those on the "Uterus in Obstructed Labour," "Contractions of the Pregnant Uterus," "Delivery of the Fœtal Head," and "Placenta Prævia," by Dr. Braxton Hicks, with a short account of his life and a list of his works; Dr. Hodgkin's paper on some "Morbid Appearances of the Absorbent Glands and Spleen," with a biographical notice; Sir James Paget's essays on "The Relation between Symmetry and Disease," on "Disease of the Mammary Areola," and on "Chronic Inflammation of Bones (Osteitis Deformans);" Dr. G. M. Humphry on "Unilateral Hypertrophy of the Gums"; and Dr. Edward Ehlers on "Danish Lazar Houses."

*The Force of Mind, or the Mental Factor in Medicine.* By ALFRED T. SCHOFIELD, M.D., M.R.C.S. London: J. and A. Churchill. 1902. Price 5s.

THIS book is divided into two parts; the first part deals with the action of the mind in causing disease, and the second with

the action of the mind in curing it. In the first part, the evidence that the mind may be a potent factor in the causation of disease is reviewed, and it may be stated that, while perhaps seeming to be biassed in his desire to make a strong case, the author fully recognises in the preface that in many diseases the part played by the mind is very small indeed either as cause or cure. While it must be allowed that the tendencies of modern teaching and specialism have been to look too much upon the body as a machine, we still do not think the mental factor has been quite so completely ignored as the author would have us believe, and indeed the number of writers which he is able to quote upon the subject is some proof of this.

The second part deals with the methods of cure ; and while we quite recognise the truth of all that is said about the possible influence of the mind over the body for good or evil, we do not quite see that Dr. Schofield has shown us how we may carry out the systematic teaching which he so desires to see accomplished. In criticising a book of this nature one must, however, remember the difficulties of the subject and the impossibility with our present knowledge of treating it with any great scientific exactness.

The subject is both interesting and important, and Dr. Schofield has brought abundant evidence together to show that no one organ can be separated from the rest of the body as an independent machine—a fact which not infrequently appears to be overlooked.

# Notes by the Way.

**The Jubilee of the Royal Medical Benevolent College.**

THERE is no need to impress upon our readers the value of the Royal Medical Benevolent College at Epsom or the claims which it has upon the support of all members of the Profession. Universal regret must be felt at the difficulties experienced by the Council of the College in making two ends meet with the funds at their disposal, and at the disappointing condition of affairs revealed by the statement of accounts, which shows a debt to the bankers of £2,900. The present year sees the Fiftieth Anniversary of the foundation of the College, and in honour of its Jubilee a festival dinner is to be held on June 10, at which the Prince of Wales has promised to take the chair. A Special Appeal for additional funds is made in connection with the dinner,[1] and we cordially hope that it may result in a satisfactory addition to the funds of the College.

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**The Infectivity of Tuberculosis.**

WE have always taken a strong view as to the infective character of tuberculosis and the necessity of taking all reasonable precautions with the object of preventing the conveyance of contagious particles by any manner of means. It is therefore with feelings akin to dismay that we hear of an attack being made on the doctrine of infectivity in this disease by no less formidable an authority than "The Man of the Moment." Lest it should not be at once clear to our readers who it is that we designate thus, we hasten to explain that we are referring to an article in our newly-arisen contemporary *The Stethoscope*, giving the substance of an address delivered by Sir Hugh Beevor. The speaker is represented as saying that the term "infection" is too loose to apply to both measles and tuberculosis, and that he preferred the word "sub-infectious"

[1] All information may be obtained from the Secretary at the office of the College, 37, Soho Square, W., where subscriptions and donations will be thankfully received.

for the latter disease; "and here *The Stethoscope* is entirely in agreement with him." The union of two such authorities is overwhelming, but we are impenitent enough to remain unconvinced, and to think the newly-coined adjective not only ugly, but also unnecessary. The process by which a disease, due to the attack of a microörganism, is conveyed from one individual to another is surely "infection," if this word has any meaning at all. There may, no doubt, be different degrees of "infectivity," but nothing is gained by applying special words to them. If we are to have "sub-infective" at one end of the scale, we shall have "super-infective" diseases at the other, and the original term will be crowded out. A great advance was made in our knowledge by the recognition of the bacterial nature of tuberculosis, and it is inadvisable to do anything to divert attention from this point. Perhaps, before leaving the subject, we may be allowed to offer our sympathy to Sir Hugh Beevor in being pilloried as "The Man of the Moment," in an article which commences with an enumeration of his appointments and principal works. Such treatment must be very distasteful to its victim. We hope that our contemporary has erred through inexperience, in failing to appreciate the views held by medical men on such matters, and that in future issues the heading may be dropped or some lay philanthropist consigned to this particular position of disadvantage.

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**Lead-Poisoning from Drinking-water.**

THE recently published Supplement to the *Thirteenth Annual Report of the Local Government Board* contains some important observations with regard to the relation of moorland water to epidemics of lead-poisoning. No very new results, perhaps, are therein set forth, but many careful observations are recorded showing that the power of water to dissolve lead is directly proportional to its degree of acidity, and that this acidity is very marked in water coming from moorlands, especially those containing peat. It is in rainy weather that the acid is principally dissolved out by the water, for, whereas in dry weather the streams are neutral or alkaline in reaction, in periods of wet they become strongly acid. The actual nature of the acid substance found in such water is not

apparently stated, but it is known to be formed by the action of certain bacteria which inhabit the peat. The power of dissolving lead and holding it in solution is to be distinguished from the property of eroding the bright metal; which latter has indeed a deleterious effect on the pipes, but does not constitute a danger to the community. Dr. Houston, the author of the report, advises that very great care be taken in the examination of water coming from various streams, and that those which are shown to have an acid reaction should be rejected as sources of supply; otherwise special means of neutralising the acid substance must be taken.

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**The Surgery of Gastric Ulcer.**

WE referred in a previous note to suggestions which had been made with regard to surgical treatment of ulcer of the stomach; and we have now to allude to another important communication on this subject made by Mr. Moynihan at The Royal Medical and Chirurgical Society on January 27 of this year. Some valuable remarks are made therein on the difference between the hæmorrhage coming from an acute and from a chronic ulcer respectively. That in the former case is sudden in onset, profuse in amount, and bright in colour. In chronic cases, on the other hand, the bleeding is much smaller in quantity, and is liable to be frequently repeated. In acute cases the hæmorrhage is often the first symptom, no indigestion having been previously noticed by the patient. In chronic ulcers there is always a history of long-continued dyspeptic symptoms, such as pain and vomiting: there is usually a large amount of fibrous thickening around the bleeding point, and arrest of the hæmorrhage is therefore difficult. It is in these cases that surgery offers a valuable mode of treatment. The cicatricial process may also result in pyloric stenosis or adhesions causing dragging on the stomach in some direction with resulting dilatation. In such a state of affairs the operation of gastro-enterostomy may afford great and permanent relief. In cases of perforation of an ulcer, whether chronic or acute, there can be no manner of doubt that immediate operation is the only proper treatment.

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**Professor Lorenz's Operation.**

THE interest aroused in the United States by the visit of Professor Lorenz seems to have been very great, not only among the medical world and the reporters for the newspapers, but also among the cripples themselves who were suffering from various kinds of deformities. Thus in the annual report of the New York State Hospital for Cripples we read that "the advent of Professor Lorenz has aroused much interest in the subject of the care and treatment of crippled and deformed children, both on the part of the public at large and especially so among the parents of the poor. This has been especially noticeable at the Orthopædic Department of the Cornell University Medical College. In anticipation of Dr. Lorenz's visit, to operate at the college clinic, a simple announcement was made in the newspapers that on certain days an examination of poor, deformed children would be held at the Cornell Clinic. The result was astonishing. On the first two stated days over 200 applied, and for over a month there was a steady stream of applicants, until over 2,000 were examined, classified, and entered for treatment. Many varieties of deformed conditions presented for examination, among them some rare conditions. If these crippled children were merely drawn from other clinics, attracted by the renown of the great Viennese surgeon, there would have been perhaps less surprise. But nearly all were patients who had previously received no treatment at all, or who had been discouraged by failure, after many ineffectual attempts, to secure hospital care. Others, having received hospital care, and having been prematurely discharged, had relapsed. The interest of all these had been excited by the hope of relief afforded by the great reputation and skill of Professor Lorenz."

The reality of the reform in operative procedure effected by Lorenz was pointed out in the interesting article in our last issue by Mr. Jackson Clarke. It is clear that previous to the visit of the distinguished surgeon, operators in this country were not really acquainted with the nature of his method. Of the striking nature of the results obtained by it there seems to be no room for doubt. It will, however, be necessary to await the fuller knowledge of these, which will rapidly accumulate as the treatment is tried by others besides

its inventor, before we can lay down certain rules as to the exact cases to which it is suited and the proportion of favourable results to be looked for.

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**Eye-strain as a Thorn in the Flesh.**

THE recently-published little book by Dr. G. M. Gould, entitled *Biographic Clinics*, is a very instructive study, in the light of modern knowledge, of a physical defect which seems to have played a prominent part in the lives of some of the most distinguished writers and thinkers. From a close consideration of the recorded histories of De Quincey, Carlyle, Darwin, Huxley, and Browning, Dr. Gould deduces the interesting result that each of these great men was the victim of ocular defect of some kind, leading to a continued state of eye-strain, and that to this alone may be attributed a great part of the ill-health complained of by each and all of them. The deduction is fascinating and indeed practically convincing. There is a curious similarity in the biographical details in the several cases. Thus we find a prominent symptom was the love of long walks, especially by night, at which time the accommodation of the eye is relaxed; writing and similar work was always followed by an increase in the symptoms complained of. A picture of De Quincey is given as a frontispiece, in which the ocular defect is actually visible, the axes of the two eyes being evidently not parallel when at rest. We may hope that in these days of improved ophthalmological methods this "thorn in the flesh" of genius may be eradicated before it makes a whole life miserable. Those who recognise the immense amount of work that has fallen to the share of Dr. Gould himself, and the many-sided nature of his literary activities, will hope also that he is not himself a victim of the condition which he so ingeniously traces in others; and that the editor of *American Medicine* and author of *An Illustrated Dictionary of Medicine*—to name but two of his titles to fame—may escape alike the ill-temper of Carlyle and the opium to which De Quincey had recourse to lighten his miseries.

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**Collective Investigation of Eclampsia.**

FEW, if any, diseases can be of more interest to practitioners of medicine than puerperal eclampsia, and there still remains much to be elucidated with regard to its causation and treatment. A *resumé* of the present state of our knowledge on this subject was given by Dr. Fothergill in the February number of THE PRACTITIONER, in which he called attention to the various theories that have been put forward as to its origin. We now hear that the Clinical Society of Manchester is undertaking a collective investigation of the matter, and has for that purpose prepared a scheme of questions which will be sent to any medical man in the British Isles who has a case of eclampsia under his care. Special attention is called to the question of the excretion of urea[1] in this disease, and observations relative to this will be especially welcomed. The forms may be obtained from the Hon. Secretary of the Investigation, Dr. J. Price Williams, of Swinton, near Manchester. We hope that medical men will aid the Society in its endeavour to add to our knowledge of the malady, both by reporting cases which occur in their practice and by persuading their neighbours to do likewise.

[1] The use of the hypobromite process with Southall's ureometer is very simple, and the apparatus is inexpensive: it can be obtained through any chemist for about 3s

# Novelties and Notices.

## LIQUOR COLCHICINÆ SALICYLATIS.

In the treatment of gout we are wont to rely on two remedies to a very great extent—one an old one, the use of which is mainly empirical, but not on that account any the less valuable; and the other a drug which is of comparatively recent discovery. We need not say that we refer to colchicum and the salicylates respectively. Hopkinson's Liquor Colchicinæ Salicylatis contains a compound of the two remedies in the form of a single salt, salicylate of colchicum, and should therefore combine the virtues of both in a small bulk. Each fluid drachm of this preparation contains $\frac{1}{8\frac{1}{2}}$ of a grain of the salt, and constitutes a suitable dose. It is a pink fluid possessing a somewhat bitter aromatic taste, and is worthy of trial in gout and the many allied conditions to which this diathesis is believed to give rise. It is manufactured by Messrs. Baiss Brothers and Stevenson, Limited.

## "LOFOTOL" CODLIVER OIL.

Of the many advances which have been made in the preparation of medicinal substances, few if any are more marked than the improvement that has been effected in the manufacture of codliver oil. The nauseous, rancid-tasting oil that we dreaded in our youth has been replaced by a nearly tasteless substance, which is deprived of many of the terrors of the old drug. A still further method of commending it to the palate has been introduced by Messrs. Southall Brothers and Barclay, in their Lofotol Codliver Oil, viz., the saturation of the oil with carbonic acid gas, so that a sparkling aërated product results. This ingenious preparation deserves a trial in those cases in which the use of the oil is indicated, while sickness or nausea results from the administration of the ordinary form. It is claimed that not only is the taste of the oil disguised in this manner, but that its digestibility is also increased by the process of aëration. The oil appears to lose the contained gas less rapidly, on exposing it uncorked to ordinary conditions of atmospheric pressure, than water

does under similar circumstances, while the heat of the mouth is yet sufficient to cause a liberation of enough $CO_2$ to produce a pungent sensation on taking the medicine.

### "KEPLER" MALT EXTRACT.

The value of extracts of malt in treating conditions of wasting and indigestion of various kinds is well recognised, and of the many preparations of this substance now available none are better known than the "Kepler" Extract manufactured by Messrs. Burroughs, Wellcome and Co. Not only is this product nutritious in itself, but it also aids in the digestion of other food-substances owing to the diastase which it contains. It is further rich in albuminoids and phosphates, both important food-principles. Delicate children often thrive wonderfully on extract of malt, used as an addition to their milk-diet; and in rickets and the little-understood conditions grouped under the term "marasmus" its value cannot be over-estimated.

### "THROGMORTON" SCOTCH WHISKY.

Much attention has recently been drawn to the question of the manufacture of spirituous liquors, and we need not refer to the differences that exist between genuine "malt" whisky and the various substitutes which are used to adulterate it, made from potato, grain, and other materials. "Throgmorton" whisky, a speciality of Messrs. J. Lyons and Co., is guaranteed to be a pure "all malt" spirit, free from all admixture of foreign matters, and well matured. It has a pleasant mellow flavour, and is evidently a sound, reliable spirit, which may be safely recommended to all who have need to prescribe whisky to their patients.

### CADBURY'S MILK CHOCOLATE.

The preparation known as milk chocolate is made from cocoa, loaf-sugar and fresh "full-cream" milk. It is thus not only a sweetmeat, but also a food of considerable value, containing all the important principles needful for the maintenance of life. It is a chocolate of pleasant flavour, and of a smooth, rather soft consistency. It may be regarded as a concentrated form of nourishment, suitable for the needs of travellers, cyclists, and others who want an agreeable and

portable kind of nutriment in view of possible temporary emergencies. The name of Messrs. Cadbury, the manufacturers, is a sufficient guarantee of the purity of the ingredients used in its production.

### DR. MUTHU'S INHALER.

This variety of oro-nasal respirator consists of a cone of perforated metal fitting over the mouth and nose, holding within the apex of the cone a plug of cotton-wool, on which the medicament desired to be inhaled is placed. The inhaler may be worn for considerable lengths of time without discomfort, the patient thus continuously breathing air charged with the drug employed. Dr. Muthu recommends for the purpose a mixture consisting of formalin (40 per cent.), 1 drachm; chloroform, 1 drachm; and rectified spirit, 2 drachms; a little of the mixture being sprinkled on the cotton-wool and renewed frequently. It is advised that the respirator be worn for several hours at a time. The inhaler may be obtained from Messrs. Maw, Son and Sons.

## NOTICES.

### *The Eleventh International Congress of Hygiene and Demography.*

We are requested to state that the Eleventh International Congress of Hygiene and Demography will be held in Brussels from the 2nd to the 8th of September 1903, under the patronage of H.M. the King of the Belgians. The Secretary-General of the Congress is Professor Dr. F. Putzeys. All information and programmes can be obtained from Dr. Paul F. Moline, 42, Walton Street, Chelsea, S.W., the Hon. Sec. of the British Committee.

### *The Sanitary Institute, Parkes Museum, Margaret Street, London, W.*

The Twenty-first Congress and Exhibition of the Sanitary Institute will be held at Bradford, commencing July 7th, 1903.

E. WHITE WALLIS, Secretary.

## Practical Notes.

TREATMENT OF TUBERCULOSIS WITH CINNAMIC ACID (HETOL).—In *The Journal of Tuberculosis* for January of this year Professor Landerer has an article giving a very glowing account of the prospects of cure of phthisis and other tubercular affections by injections of cinnamic acid. He considers that with proper care in its use it is possible to ensure as much as 90 per cent. of cures, and he quotes Weissmann as saying that "by a thorough instruction of the general practitioner in the hetol treatment, in connection with an early diagnosis, if necessary by the tuberculin test, every other treatment of tuberculosis becomes unnecessary. He (Weissmann) believes that public sanatoria for the poor, the results of which in Germany leave much to be desired, will become superfluous, and that sufficiently-informed general practitioners will be able to cope successfully with the disease." Cinnamic acid or hetol is a substance which has the power of increasing the quantity of leucocytes present in the blood, and it is to this property that its use in tuberculosis is attributed. Landerer advises the use of the drug by intravenous injection. "The injections are made three times weekly, commencing with a small dose of one-half to one milligram. . . . Gradually the dose is increased by one-half to one milligram, until the most suitable dose for the individual case has been reached." Patients differ much as to the dose which they can stand: the more advanced the case and the weaker the patient, the smaller must be the amount administered. In cases of mixed infection the hetol alone will not effect a cure, and Landerer has devised a special mode of treatment for these by means of a preparation of colloid silver, known as lysargin, which counteracts the secondary pyogenic infection. This drug also is administered by intravenous injection, 7 to 9 cc. of a 1-per-cent. solution being given as a dose. Laryngeal tuberculosis, as well as pulmonary, is said to be benefited by treatment with hetol.

DYSMENORRHŒA.—In a lecture on this subject delivered at the Polyclinic, Dr. Horrocks pointed out that pain of a severe character at the menstrual period may be due to disease either of the uterus, the ovary, or the Fallopian tube. The ovary is suggested as the source of the trouble when the pain begins a day or two before the flow; whilst when the onset of the pain coincides with, or is increased, by the flow, the uterus is probably at fault: in the latter case there may be blood-clots or pieces of membrane in the discharge. Uterine dysmenorrhœa is more amenable to treatment than that depending on ovarian disease. The simple remedies, such as rest, hot applications, bromides and other drugs, must first be tried before having recourse to heroic measures of a surgical nature. Morphine is to be avoided, as it is especially liable in these cases to set up a habit more injurious than the original trouble. Alcohol is also a treacherous remedy. In uterine cases dilatation may do good: in those due to the ovary the removal of one of these organs may be practised, if the pain is very severe and if there are symptoms pointing to its involvement. The removal of both ovaries is a serious matter and one not to be lightly undertaken, though in cases of great severity it may be legitimately performed. It is well in such a case to make sure of the necessity of the operation by securing the concurrence of at least two expert advisers; and, of course, the effects which will ensue on such a procedure must be carefully explained to the patient.

Professor Stevenson (*The Scottish Medical and Surgical Journal*, January and February, 1903, pp. 1 and 124) points out that in many cases of menstrual trouble—not only dysmenorrhœa but also amenorrhœa—permanganate of potassium is a very valuable remedy. It may be given in doses of two grains, three times a day, and is especially useful in cases in which there is some vascular defect, which may be manifested by the presence of varicose veins or by a tendency to blueness of the extremities.

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SNAKE-BITE.—An interesting paper appears in *The Glasgow Medical Journal*, by Dr. George Lamb, of the Indian Medical Service, on the subject of snake-poisons. In it he shows that

the poisons of different kinds of snakes differ from one another in their nature and effects to such a degree that, for instance, cobra-venom contains no single poisonous element that is present in the poison of the snake known as Daboia. The latter is one of the viper tribe, while the cobra is a colubrine serpent. Even in the latter group, however, the different members secrete venoms of varying character, the snakes known as Kraits owning a poison distinct from that of the cobra. Cobra-venom acts directly on the nervous system, causing death by asphyxia, due to paralysis of the respiratory centre; the daboia's poison, on the other hand, has a local action on the blood, causing in large doses a coagulation in the vessels, while in smaller amounts it produces a tendency to hæmorrhages and a breaking-up of the red corpuscles. By way of treatment, the only real antidote to cobra-venom is the serum prepared by Calmette, which is reliable if fresh. It must be given in considerable doses, *e.g.*, 40 cc., intravenously if possible. Subcutaneous injection is less efficacious, as it is much more slowly absorbed. No specific serum is available for the other kinds of snake-bites; these must be treated on general principles, by stimulants to keep up the heart's action, and so on. The reliance which has been placed on various specifics in the East, such as magic stones, leaves of plants, and spells and incantations of many kinds, has arisen from reports of cases in which either the snake was a small one or did not get its teeth home in its victim, or from the fact that a certain proportion of cases, especially of bites from viperine snakes, tend to get well of themselves. Perhaps in course of time special serums will be prepared for the different varieties of poisonous snakes, so that remedies will be available for all cases.

# THE PRACTITIONER.

**MAY, 1903.**

## ON CANCER OF THE LIPS.

By SIR THORNLEY STOKER,

*Surgeon to the Richmond Hospital.*

THAT the lip is one of the situations in which cancer attacks the human body most frequently is a well-established fact. That it is also the part in which operation offers the most favourable results, as compared with its performance when the disorder occurs in other situations, will probably be generally admitted.

The *Special Report on Cancer in Ireland*, just issued by the Registrar-General, sets forth evidence concerning the increase of the disease. He shows in the following table that a cancer death-rate which was 4·6 per 10,000 of the population in 1891, increased steadily from 5·8 in 1897 to 6·5 in 1901. This is a grave state of affairs. The statistics of lip-cancer which are pertinent to this paper are quoted later on.

YEARS AND DEATHS.

| — | 1897. | 1898. | 1899. | 1900. | 1901. |
|---|---|---|---|---|---|
| Number of deaths from cancer | 2635 | 2657 | 2654 | 2717 | 2893 |
| Rate per 10,000 living - - | 5·8 | 5·9 | 5·9 | 6·1 | 6·5 |

### ÆTIOLOGY.

*Heredity.*—In a large experience I have not found evidence to show that epithelioma of the lip is due to an inherited disposition. That the same provocative causes exist among the same classes and in the same districts is true, and thus father and son are occasionally attacked, but an incidence of this sort does not in any sense constitute heredity. The great bulk

of cases of lip-cancer which are admitted to the Richmond Hospital come from the Western counties of Ireland, and this can be accounted for by the methods of smoking practised in those regions, to which subsequent reference will be made. But while members of the same family may become affected, it is because of their exposure to the same causes and not to an inherited disposition.

It is, however, right to say that there are at least two causes which operate against exact investigation of the question of inherited disposition to cancer of the lip. One is that the disease is infinitely more common among members of the labouring classes, from whom it is difficult to obtain correct information, than among people of better education. The other is that, as the lip is usually attacked in middle or old age, the period between its engagement in successive generations is generally a long one, and unlikely to lead to exact history.

*Predisposing Causes.*—Like epitheliomata in other superficial situations, cancer of the lips, when it occurs at or after middle age, is often preceded and accompanied by a general papillomatous condition of the skin, or by the allied state in which there is a hyperplasia of the cuticle in scaly masses. This condition is distributed over various regions of the surface, and is usually best marked on the face, neck, and front of the chest. It is so frequent that it should be regarded as a warning of graver trouble to come, and as confirmation of the diagnosis of an otherwise doubtful case of epithelioma. It bears the same relation to epithelioma of the skin that leucoplakia does to cancer of the tongue. Warts on the lips, if they have been irritated by treatment, or subjected to much handling or other irritation, often undergo a change to the heteroplastic condition and become malignant.

The use of the pipe is the exciting cause of lip-cancer in almost every case. The disease is rarely found in non-smokers. The few cases of epithelioma of the lips which I have seen in women were all in peasants who smoked. The great bulk of the cases of this class in the Richmond Hospital come from the more remote parts of Ireland. In these districts the short, hot, clay pipe is still smoked; while in Dublin, and in regions closer to the cities, where the briar-root pipe is in use,

cancer of the lip is not nearly so common. If further evidence be necessary in this direction, it may be found in the fact that patients can nearly always tell you that the cancer has appeared on the side on which they use their pipes. Within the last year a patient in the Richmond Hospital presented the very unusual condition of an epithelioma exactly in the centre of his lower lip. He was in the habit of smoking with his pipe held in the centre of his mouth. The Registrar-General's Report, already referred to, endorses these views as to the use of clay pipes as a cause of epithelioma; and farther suggests that the disease may be conveyed from one person to another by the use of the same pipe.

Another factor to be considered is the irritation caused by broken, decayed, or irregular teeth. Such a cause may occasionally be found behind an epithelial ulcer, and then, if the disease be seen early, it will be found only to engage the mucous surface and edge of the lip. This is consistent with the fact that cancers resulting from foreign irritation, such as those produced by a pipe, are chiefly superficial to the mucous and submucous tissues. Fissures of old standing which resist permanent healing are occasionally the starting-points of epithelioma of the lip.

It is doubtful if syphilis is of importance as a predisposing cause of cancer of the lip. This opinion is borne out by two facts; first, that epithelioma of the lip is rare in members of the upper classes, who are more often affected by syphilis than peasants; and second, that cancer rarely, if ever, begins at the angle of the mouth where late syphilitic disease usually shows itself, and where, if it were an exciting cause, it would most naturally provoke an epithelioma. This is remarkable when we remember that syphilitic disease of the tongue is unquestionably provocative of cancer.

*Age.*—I have not seen cancer of the lip in persons under 30 years of age, and rarely between 30 and 40. From 40 to 50 it is much more common; but the great bulk of cases are in persons over 50 years of age.

*Sex.*—The freedom of women from cancer of the lip is notable. I have operated on over 350 cases, and have seen many others, and all were males except three. These three were Western peasants who smoked assiduously. It is not

probable that sex has any direct influence; the reason why women are comparatively exempt is rather to be sought in the fact that few of them smoke pipes, and that they are less subject to traumatic influences than men.

The Report of the Irish Registrar-General states that of 1,296 deaths of men from cancer in 1901, 63 were from affection of the lip; while of 1,597 deaths of women during the same period 11 only were from this disease attacking the lip. We may fairly assume from our clinical knowledge that all these cancers of the lip were of the epithelial type.

If it be remembered how favourable the result of operation for epithelioma of the lip is, as contrasted with the result of operations for cancers in other parts, it will be evident that a total death-rate of 63 out of 1,296 in males, and of 11 out of 1,597 in females, is only a relative indication of the greater number of persons who must develop cancer in the lip, and how common the disease is in that region.

*Class.*—Position in life seems to have some bearing on the liability to cancer of the lip. The disease is comparatively rare among the upper classes. This may be explained by the greater care taken of the teeth, and, if a pipe be smoked, by the use of one not made of clay.

*Part of Lips affected.*—The disease is almost invariably situated in the lower lip. Out of all cases operated on, and many others examined, I have only seen the upper lip engaged in four; one of these was in a woman. This takes no account of advanced cases where cancer has commenced in the lower lip and invaded the upper. The side of the lip to be affected naturally depends on the seat of irritation, wherever it may be.

## CLINICAL COURSE.

The *progress* of a lip-cancer when not checked is tolerably definite in its direction. It proceeds to infect the lymphatic glands below the jaw, and, later on, down the neck. The submaxillary salivary glands do not become affected until extensive infection of the lymph-glands has taken place. Next the lower jaw becomes involved, and, lastly, the floor of the mouth. It is the rarest circumstance for the tongue to become cancerous, as the patient generally dies before such a complica-

tion takes place. Secondary cancer, in the shape of deposits in remote organs, may practically be looked on as unknown, death preceding their possibility.

*Mode of Death.*—The usual method of death is by exhaustion, septic disease of the lungs, or hæmorrhage.

## DIAGNOSIS.

The disease in this region is always a squamous-celled epithelioma, and its diagnosis is usually an easy matter. There are only two conditions which could be confounded with it. One of these is sarcoma, which is of extreme rarity in the neighbourhood of the lips, and which if seen early will be found to have commenced in the substance of the cheek and to have engaged the lip by extension, whereas an epithelioma of the lip has its primary origin on the surface, and at the edge of the mouth. I have seen two such cases of sarcoma. The other condition is a syphilitic sore either primary or subsequent. The diagnosis is generally a very simple matter, and, if the history and a careful examination does not make the case clear, a short use of mercury would be conclusive. However, a case is seldom seen in which this is necessary.

## TREATMENT.

The ready diagnosis, the clearly-defined lines of operation, and the usual success of such operations are perhaps the reasons why our treatment of lip-cancer stands much where it did 30 or 40 years ago. It was then, as it is now, highly successful, and we have not had so much to learn concerning the disease in this situation as in other parts. There are here none of the striking developments that modern surgical methods have brought to other regions. One great lesson, and one only, has probably been learned—the propriety of the disuse of caustics and pastes of all kinds. So evident is this to most surgeons that it is surprising to find that within comparatively recent years their use has been advised and methods of employing them described. It is not likely that any surgeons of experience could now be found to advocate, or even excuse, their employment. In Ireland one sees sad

evidences of the use of caustics. They are extensively resorted to in remote parts of the island by quacks and so-called "wise men" and "wise women"; and numerous cases come to the Dublin Hospitals which have been thus treated until the disease has been aggravated beyond all hope of relief. Nor have I seen much better results when caustics have been used by qualified practitioners. Formerly we saw cases thus treated by men in our profession; now nearly every qualified man seems to recognise that early and sufficient operation is the only measure which should be adopted.

*Operation.*—In its early stage where only the lip with a portion of the chin is diseased, operation is both simple and successful, and is rarely followed by recurrence of the cancer. When the lymph-glands are affected, provided only those in the submaxillary space are engaged, and even when the submaxillary gland on one or both sides requires removal, the operation is still a most favourable one, provided a sufficiently free dissection is made. But when the lower jaw has become diseased, a condition always accompanied by more or less extensive cancer of the chin, and perhaps of the lower part of the cheeks, operation assumes a different aspect and should rarely be undertaken. In most cases advanced to this stage not only is the lymphatic infection too great to allow hope of a cure, but, also, when the jaw and soft tissues are removed, no covering can be got to make a surface over the seat of operation or to close the chasm which remains. Saliva dribbles away; the tongue is exposed and deprived of much of its attachment. Only fluids can be swallowed, and the patient dies a miserable death; indeed he probably dies much sooner than if he had been left to nature. Therefore, if the disease of the jaw and of its soft coverings be extensive, operation is best left undone.

*Methods of Operating.*—This is not the place to enter into the details or description of the various well-established methods of operating for the removal of a cancerous lip and the parts involved with it. These are well-known surgical procedures, and the real question which presents itself is, which of them is necessary in a particular case, and what general principles are to be observed in selecting and performing it? The removal of a portion of the lip for a small

epithelioma is a simple matter, and is not much complicated by a moderate engagement of the submental lymph-glands. Whatever incisions may be considered necessary should be carried at least half to three-quarters of an inch free of the disease, and should be extended sufficiently to remove any infected glands. If doubt exists as to the disease of such glands, incisions should be planned so as thoroughly to explore the region and facilitate their removal. Enlarged glands may often be found in the submaxillary space when it has been laid open, which could not be felt before the space had been exposed. While I repeat the opinion already expressed as to the inexpediency of operating in cases where the chin and lower jaw, together with the glands, are extensively diseased, I do not think that lymphatic engagement alone is a reason to prevent operation. A most extensive dissection of the cervical glands, as low as the clavicle—even when this proceeding requires repetition, and perhaps on both sides—will often give a perfectly satisfactory result. In April, 1899, I was consulted by a gentleman who in the previous year had a cancer removed from his right lower lip. He suffered from both local and glandular recurrence. During the period between April, 1899, and July, 1901, I operated on him no less than five times. The operations were all of a most extensive character. The first involved removal of a great part of the right cheek and half of both lips, with a complete dissection of the submaxillary space. The last consisted of a dissection of the whole of the right side of the neck along the carotid sheath, extending so deep as to expose the pharynx and transverse processes of the vertebræ, and going behind the mastoid process. The lowest of the diseased glands lay in immediate contact with the clavicle. This patient is now in rude health and without any evidence of recurrence. There was not one of the five operations to which reasonable objection might not have been made by a very conservative surgeon. This is but one of a number of cases of older date and with a similar bearing which could be quoted in relation to the point in question.

The submaxillary glands are rarely infected until long after the lymphatics have become diseased. But in cases where the latter glands, below the chin, require removal, it is good

practice to remove one or both of the submaxillary salivary glands, except in cases of very recent history and when these glands are beyond suspicion.

With regard to the method of operation, I have but one strong opinion in addition to those stated. It is that all intricate cutting and elaborate movement of flaps should, as far as possible, be avoided, and the operation, however extensive, be as simple as may be. The more elaborately cosmetic the operation—the more its intricacy extends beyond the necessities of the case—the more likelihood there is of recurrence. It is astonishing how, after quite simple but most extensive incisions, the parts finally adapt themselves to their new positions, and how little ultimate disfigurement there is. The lips and cheeks are extraordinarily plastic, and eventually suit new conditions in a way that could not easily be anticipated. Besides, having regard to the circumstances, usual sex, and age of the patients, purely cosmetic considerations are not of primary importance.

## PROGNOSIS.

As regards the future of the patient, it will be seen, if the foregoing views are accepted, that the prognosis is extremely good even in severe cases, if the operation be thorough. There is no form of cancer so little liable to recurrence as epithelioma, and no region in which such good results are obtained by operation as the lips. I have already given reasons for the difficulty of giving statistical details on this point, but I venture to offer the opinion as the result of long observation.

# EXCISION OF THE TONGUE FOR CANCER.

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[With Plates XLVII–LI.]

In 1891 I read a paper before the London Medical Society on excision of the tongue,[1] in which I stated that during the twenty previous years my operations upon the tongue for cancer amounted to 139. For the purpose of arriving at an estimate of the direct risks resulting from excision of the entire tongue by scissors, as distinct from those operations which are associated with excision of invaded muscles and glands, I differentiated my cases and tabulated them under different headings, as it is obvious that when once the disease has extended beyond the limits of the tongue-tissues the results of operations ought not to be compared with those where the tongue alone is concerned. That a marked distinction should be made is most important, for if it were more generally recognised how eminently successful excision of the entire tongue is, surgeons would be less reluctant to recommend the operation, and patients to consent thereto.

With this distinction in mind I gave in my paper a list of 66 cases out of the 139, in which I had excised the entire tongue with scissors, with only three deaths; and since then, now twelve years ago, I have not had a single death. During the last twelve years I have excised the tongue independently of other complications on 50 occasions without a death, which gives a list of 116 operations with only three deaths (2·5 per cent.)—a mortality lower than I have ever seen recorded elsewhere. The causes of death in the three cases are worth mentioning, as they do not in the least detract from the merits of the operation. The first was a patient, æt. 56, who was suffocated through the rupture of an abscess of the lung on the second day. The second, æt. 68, died on the twelfth day

[1] *Transactions of the Medical Society*, 1901; *The Lancet*, May 9, 1901; *British Medical Journal*, May 2, 1901.

from syncope; and the third, æt. 70, on the fourteenth day from exhaustion, after the floor of the mouth had quite cicatrised. I wish this statement to be accepted as tending to show that the whole tongue may be completely removed without any external incision, preliminary ligature of the lingual arteries, or a previous tracheotomy.

There are at least two matters of common agreement amongst surgeons relative to this operation: the first is that operations on the tongue for malignant or even suspected malignant disease cannot be performed too early; and the second, that the associated glandular area of the tongue ought to be explored, either at the time or subsequently, independently of there being any evidence of glandular enlargement.

Whilst there exists a consensus of opinion on certain fundamental principles in general surgery, some surgical authorities entertain widely divergent views when particular operations are under discussion, and excision of the tongue is a notable example. I must confess that I fail to see any valid reason why the tongue should not be dealt with on the same sound surgical principles which are applicable to other parts of the body. The four chief deviations are—division of the jaw; the use of the écraseur; preliminary tracheotomy; and preliminary ligature of the lingual arteries.

In my experience, division of the jaw is unjustifiable in excising the tongue, or even in removing the glands beneath. Syme's first three cases proved fatal, and I believe that in all he only had one successful case.

Removal of the tongue by the écraseur, either galvanic or steel-wire, is another notable example of this deviation from the common principles of ordinary surgery. The écraseur ought, in my opinion, to be abolished from the list of recognised surgical instruments. One of our most venerable and accomplished surgeons, who regards the écraseur as the safest instrument, candidly admits that after the wire has cut through the substance of the tongue he considers it expedient to ligature the arteries, and only claims for the practice that it effectually controls hæmorrhage from the smaller vessels—neglecting the fact that these insignificant sources of bleeding derive their blood-supply from the main arteries, and that when the main arteries are secured the *raison d'être* for the écraseur disappears.

Another distinguished surgeon, who strongly advocates the écraseur for the removal of the tongue, relates an instance where three-quarters of an hour was necessary before complete division of the organ was effected ; nevertheless, as a safeguard he applied a strong catgut ligature round the left lingual artery, leaving the right vessel unsecured, with the result that, within twenty minutes, sharp hæmorrhage followed, necessitating the application of a ligature.

If we contrast the time occupied by the écraseur, together with the prolonged anæsthesia, with the time that is required to excise a tongue with scissors and torsion of the vessels, I venture to think that the evidence is strongly in favour of the method which I have so long advocated.

Surgical opinion is also divided upon the question whether there is a necessity or not for performing a tracheotomy or a laryngotomy before excising a tongue. The only justification claimed for these preliminary operations is that they guard against the air-passages being invaded by blood and septic matter during the operation ; but as I contend that this risk can be successfully guarded against, I cannot admit that there is any advantage in subjecting the patient to the additional risks which are unquestionably associated with opening the air-passages. Further, I maintain that there is a greater mortality following ordinary tracheotomy than need result from excision of the tongue.

Preliminary ligature of the linguals is, in my opinion, quite unnecessary, and for the average surgeon it is much easier to secure the vessels in the mouth than in the neck. Sir Frederick Treves, who strongly advocates ligaturing the linguals before excising the tongue, candidly admits that there are elements of uncertainty, difficulty, and danger in the proceeding, and further adds : "It is by no means difficult to make a mistake in securing this small and deeply placed vessel" ; and "I have known other structures to be ligatured in the place of the lingual artery, and the bleeding as a consequence to have been very free." To such an accomplished surgeon and anatomist as Sir Frederick Treves ligaturing the linguals is no doubt an easy undertaking, but this is an operation which the average surgeon might very reasonably hesitate to attempt.

The operation I described in 1881 has been so variously, and generally inaccurately, described during the last twenty years, that I feel justified in again referring to some of the more essential details of the operation, and adding a few minor modifications which experience has induced me to adopt.

In the first place, I regard the position of the patient's head during the operation as a matter of the very greatest importance. The operator must be able to get as near to his patient as possible. The patient's head must be under the immediate control of an assistant who can at a moment's notice either elevate it to admit light into the mouth, or depress it to allow any blood to escape.

To secure the best advantages, I have never found any operating table, however complicated—so-called perfect—to compare with an ordinary high-back rocking-chair. In such a chair a patient, when suitably secured, can by the simplest means be raised from the horizontal to the upright position, or lowered to the horizontal or any intermediate stage at a moment's notice.

The method of securing the patient to the chair without in any way hampering respiration requires strict observance of the details of an effectual method which Mr. Alex. Wilson, who has been associated with me in operating upon the tongue for the last twenty years, and I devised. As I have found it very difficult to describe the method of fixing the patient to the chair, I have had photographs taken not only to explain the application of the towel which we use for this purpose, but also to illustrate the position of the patient at the different stages of the operation.

An ordinary roller or "Jack" towel is used to secure the patient to the rocking-chair. It will be seen from the photographs that a loop of the towel is first of all placed in the nape of the neck behind the head of the patient by someone standing in front. The sides of the towel are then placed under the arms of the patient, and the remainder of the towel collected behind the chair and passed through the loop behind the patient's head. The towel is then pulled taut, and passed over the back of the chair; and immediately before the operation is commenced, and when the chair has been elevated for the purpose, the towel is firmly secured to the

PLATE XLVII.

Fig. 1.

Fig. 2.

PLATE XLIX.

Fig. 3.

PLATE L.

Fig. 4.

Fig. 5.

cross-bar below the seat. By this contrivance the patient is securely fixed to the chair, without the towel unduly interfering with respiration. The desired elevation of the chair is regulated by wedging two lengths of wood beneath the rockers, one in front and one behind. The position of these wedges can be instantly changed by the foot of the operator in front, or by the assistant behind the chair.

During the administration of the anæsthetic, the chair can be thrown back and the patient allowed to recline in a horizontal position. During the operation the patient can be raised to an upright position most convenient for the operator. In case of any suspicion of syncope, the patient can be instantly lowered to the recumbent position. The assistant who administers the anæsthetic not only regulates the elevation of the chair, but he also manipulates the position of the patient's head during the different stages of the operation.

One of the advantages of the rocking-chair is that it can usually be found in the average household.

Fig. 1 illustrates the method of fixing the "roller towel"; Fig. 2 shows the position of the patient when receiving the anæsthetic; Fig. 3 the position of the patient when being operated upon. In Fig. 4 is shown the position of the patient's head when it is necessary to clear the mouth of any blood; and in Fig. 5 the patient is seen thrown back into the horizontal position, which is easily done should any indications of syncope arise.

The details of the operation itself may briefly be described as follows:—

1. When the patient is narcotised, gag the mouth on the opposite side to the one intended to be operated upon; but if it is contemplated to remove the whole tongue, use two gags—one on each side.

2. Seize the tip of the tongue with a pair of forceps; pull it forwards, and when it is in this position, pass through it a strong ligature for the purpose of forward and upward traction during the operation. This is a most important matter, as the traction not only controls to a large extent the main arteries, but it makes all the subsequent stages of the operation much easier.

3. With this ligature in his left hand, the operator draws the tongue forwards and upwards to the fullest extent, and

commences the excision by freely dividing the frænum by means of a pair of scissors. The lower blade of the scissors is slipped under the mucous membrane on one side of the tongue and run along this side as far back as the anterior pillar of the fauces. By closing the scissors the attachment of the mucous membrane to the jaw is severed. After dividing the anterior pillar of the fauces he finally liberates the lateral attachments. As a rule, after dividing the frænum, a finger can be easily run under the mucous membrane, and be made to act as a guide for the scissors. The same proceeding is of course repeated on the other side, when the whole tongue is going to be excised.

If these incisions be completely accomplished, it will be found that nearly the whole of the tongue can be pulled out of the mouth, making the remainder of the operation almost *extra-oral*—at any rate so much so that there need be little fear of any blood getting into the air-passages.

Now the more critical part of the operation commences—the one most dreaded by the inexperienced. Having proceeded so far in separating the tongue with scissors, the timid surgeon need make no further use of a cutting instrument, if he wishes to avoid any risk of unintentionally dividing the arteries. The tissues can be ruthlessly broken down and torn asunder. With a dry dissector he can break down the remainder of the friable tongue, and expose the arteries and the nerves as cleanly as if he were making a dissection. Nothing is then easier than seizing each artery separately by forceps, snipping the distal end, and gently twisting the stump of the vessel. The greatest confidence may be established by the almost universal certainty that if, after the forceps are removed, no immediate bleeding of that artery takes place, no subsequent hæmorrhage need be feared. This, in my opinion, is an unanswerable argument in favour of torsion as against the use of the ligature, which some surgeons use in preference.

Having twisted each artery, it is desirable, in my opinion, before proceeding further to place a loop of a strong ligature through the under and attached part or stump of the tongue, to prevent the stump falling back when the tongue is finally removed. That this is an advantage is denied by Sir Frederick

Treves; but I still maintain that a ligature should be passed through the glosso-epiglottidean fold for the purpose of traction after the tongue has been excised, should secondary hæmorrhage occur—a very remote contingency. In private practice it certainly affords the attendant nurse an element of confidence. In hospital practice the precaution is perhaps unnecessary.

The final separation can be completed by either snipping through the remaining muscular fibres, or deliberately twisting the stump until the tongue becomes completely detached.

After the tongue is removed and any small vessels still bleeding twisted, and when the floor of the mouth is quite dry, it is a great advantage from more than one point of view to apply a varnish to the floor of the mouth. I am in the habit of using a varnish which I originally suggested in 1881, and which is made by substituting for the spirit ordinarily used in the preparation of "Friar's Balsam" a saturated ethereal solution of iodoform, adding one volume in ten of turpentine. In addition to other advantages, it has a marked influence in checking capillary oozing, and deadens the acute sensibility of the raw surface; and it also enables the patient to take liquid nourishment almost immediately after the operation. The varnish further tends to lessen the danger of septic infection. It may be applied repeatedly throughout the healing process, and most patients welcome each application.

As an ordinary routine, it is desirable to prop the patient up in bed and prevent his reclining during the first night. The next day he should be encouraged to get out of bed and sit up; and on the second day, if the weather is congenial, there is no disadvantage in allowing the patient to go out of doors.

Only strong blunt-ended scissors need be used. I mention this because I am constantly receiving letters from most parts of the world asking for a description of the scissors I employ. I have already disposed of nearly a gross of scissors in preference to sending a description. I need scarcely add that previous to an operation the surgeon should endeavour to get the cavity of the mouth in as perfect a state of sanitation as circumstances will permit.

Where the disease is strictly limited to one half of the tongue, there is no necessity to excise the whole; but whether

there is any distinct advantage in retaining the other half is an open question, at least so far as the future powers of mastication and articulation are concerned.

It is impossible to assert in any case, or at any period of the disease, that the glands are not infected, and it is also sometimes equally difficult, when the glands are tangibly enlarged, to say whether the enlargement is due to a malignant infection or simply to an inflammatory condition. As a sound principle in surgery, it is always desirable, where malignancy is suspected, to expose as far as practicable the whole area of associated glands, and to remove every visible particle of fat and gland, just as we proceed to clear out the axilla in mammary cancer.

Even when the glands are so far involved that their removal cannot be entertained, the removal of the tongue alone is frequently not only justifiable, but most desirable, as the pain and the discomfort are materially diminished by simply removing the offensive mass. There is also every reason to believe that life is prolonged by so doing, as the risks from auto-septic intoxication and nervous exhaustion are unquestionably diminished.

Relieving tension when the cervical glands get inordinately enlarged during malignant development is also a resource of great value. A striking illustration of this came under my notice in the Manchester Royal Infirmary some years ago. A man with an unusually large and painful growth in the region of the cervical glands attempted one day in a fit of despair to cut his throat, and in the endeavour he divided the tumour in half; by this relief of the tension the pain was dispelled and his desire to live revived. I have frequently profited by this experience, and relieved the tension together with the pain in irremovable malignant growths.

It is a well-known and an encouraging fact that in cancer of the tongue death generally takes place before dissemination has extended beyond the limits of the cervical glands—that in fact up to the very end, the extent of the disease is within the range, if not the possibility, of surgical eradication. We ought not to allow minor considerations to stay our hands when we have to deal with such an uncompromising disease. I have excised portions of the common carotid artery twice, and the

superficial and deep jugular veins on several occasions in the process of removing glands from the neck.

If the sterno-mastoid conceals glands which cannot be satisfactorily reached without sacrificing the muscle, it ought to be removed from its origin to its insertion rather than neglect a single gland. I have done it more than once without the patients suffering any material inconvenience through the loss of the muscle. Operations on the neck, even including the removal of enormous thyroid glands, are amongst the most successful, and least fatal, in surgical practice.

The ætiology of cancer—the predisposing influence of syphilis, smoking, the irritation of sharp teeth, and of the plates of artificial teeth,—is too well recognised to require any reference; but I have been very much struck by the almost total absence of any hereditary history in the several hundred cases with which I have met. I do not think, however, that I have been successful in obtaining a trustworthy history in more than 5 or 6 per cent. of the cases which have come under my notice.

Since I commenced writing this article, I have incidentally had my attention drawn to three patients whose tongues I excised several years ago. One patient wrote to inform me that on the 13th day of next July it would be thirteen years since I removed his tongue. Quite recently my colleague, Dr. Harris, informed me that he had a patient under his charge in the Manchester Royal Infirmary whose tongue I had excised twelve years ago. I visited the patient and found that there had been no recurrence, and that the patient's speech was very good. In this case I had also excised the glands in the neck.

Dr. Davidson of Congleton on the 28th of last month wrote to me that his groom, from whom I had removed the tongue in 1889, lived until 1900; and that until within eight months of the patient's death he had enjoyed excellent health, and did not appear to suffer much inconvenience from the want of his tongue. Recurrence, or an independent outbreak, commenced in the floor of the mouth, and ended fatally. This case is of special interest because, from the beginning until the end, it was under the observation of a medical man, and there was no doubt whatever as to the diagnosis of the

original disease. I have advisedly used the words "recurrence, or an independent outbreak." These cases further tend to show that the opinion which prevails with some surgeons, that after excision of the tongue for cancer the patient can only survive about three years, is not of general applicability, and also, the further statement, that if a patient lives beyond this period the case was probably not one of cancer, is equally open to question.

I have lost touch with a plumber in Southport whose tongue I removed fourteen years ago, but who, when I last heard from him two years ago, was in excellent health, and an accomplished local public tenor singer.

The cases which I have quoted also tend to prove that, provided the tongue and adjacent affected parts are removed thoroughly and early, there exists a fair prospect of life being extended beyond the three-year limit. My confidence in the success of lingual surgery in cases of cancer distinctly increases with my extended experience.

# ON CASES IN WHICH I HAVE EXPERIENCED GREAT DIFFICULTY IN THE DIAGNOSIS OF CANCER OF THE TONGUE.

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I HAVE so recently written on the early diagnosis of Cancer of the Tongue (*British Medical Journal*, 1903, February 14), that it might well be thought that I had already said all I could have to say upon the subject. But, when the Editor of THE PRACTITIONER asked me to write one of the series of articles for this number, I determined to approach the subject of diagnosis once more, but from a somewhat different point of view.

Instead of setting down all the different conditions which may be mistaken for cancer of the tongue, I propose to describe actual cases in which I have myself been seriously puzzled as to what ought to be done; or in which an error of diagnosis has been made.

## IRRITATION ULCERS.

i. A good many years ago, when I was collecting cases of disease of the tongue in order to have sketches made of them, I was told that an old man with cancer of the border of the tongue was under the care of one of my colleagues. I asked permission to examine him, and found a very small, raised, hard ulcer just beneath the left border of the tongue some distance back, absolutely indolent, and without the least sign of inflammation about it. All those who saw it felt sure it was a very small epithelioma, and it was to have been removed; but, a rough and carious tooth in the lower jaw was removed first in order to prepare for the operation on the tongue a few days later. In those few days, with some simple application, such as weak boracic lotion, the sore completely healed, and the raised hard border subsided, so that it was evident that the lesion had been but a small

indolent ulcer, produced and kept up by the irritation of the carious tooth.

ii. A housekeeper was sent to me on account of a sore place, of three or four weeks' duration, on the right border of the tongue. It was seated on a raised base, was indolent, was quite superficial, and was covered with a thin slough, but it looked as if it had been gouged out of a little mass of epithelioma. The corresponding submaxillary lymphatic gland was slightly enlarged, so as to be quite palpable. The patient attributed the ulcer to the scratching of a lower tooth. She had filed the tooth down as well as she could, but without any improvement. I was afraid the disease was cancer in an early stage; but, as it appeared still to be irritated by the teeth, and I had in my mind the former case, I ordered the removal of the second and third molars, which were not sound, and gave her an application of chromic acid in water. Three weeks later I saw her again, when the sore was absolutely well.

*Comments.*—These cases are valuable, not only on account of the likeness of the sore to cancer—a likeness so close that in the first case, particularly, we were all deceived—but because they illustrate the rapidity with which such sores get well on the removal of the irritation. The little ulcer was really well in the course of a few days, and the larger sore was completely cured in less than three weeks. In each case the improvement was manifested immediately on the removal of the cause. I would urge the importance of this. There are many cases in which cancer does develop from just such a sore as one of these, due to the rubbing of a tooth; and there is a period in the life of such ulcers when the transition to cancer has not yet taken place, but is just taking place, or is about to take place. It is impossible for the most practised eye and touch to determine whether the border-line is passed in these delicately-balanced cases. Fortunately, the rule of practice is clear. The cause of irritation, whatever it may be—jagged teeth, carious teeth, rough or irritating stoppings, artificial tooth-plates — must instantly be removed or dealt with so thoroughly that the irritation absolutely ceases. A simple lotion, such as weak chromic or boracic, is applied several times a day, smoking is stopped, and soft diet is ordered.

From the moment these measures are adopted, improvement ought to commence; and, within a week, should be so decided as thoroughly to justify a continuance of the treatment. The ulcer, unless it be of considerable size, ought to be healed within a fortnight, or three weeks at the outside.

If, on the other hand, the ulcer, instead of commencing to improve and heal, slowly extends or even continues as it was, no time should be lost in removing it; and the extent of the operation must depend on the degree of infiltration of the tongue revealed at the time of the operation.

### SYPHILITIC ULCERS.

iii. Some years ago a gentleman between 40 and 50 years of age was brought to me that I might give an opinion as to whether it was worth while to operate for cancer of his tongue. He looked very ill, and not at all a good subject for a severe operation. His mouth showed the traces of past specific disease, for there were cicatrices and leucomata on the tongue, all the fore-part of which, as well as the front of the floor of the mouth, was in a bad condition. But, in addition to the old specific disease, there was "cancerous" warty growth and ulceration near the tip of the tongue and in the floor of the mouth. I thought, if the operation was performed, I should be asked to do it, and I did not like the look of the patient. I made a very careful examination of the mouth, and came to the conclusion that, although the case was a very bad one, still the disease was within reach of removal, and the patient must take the chance of recovery. Thus far, I had almost taken it for granted that the disease was cancer. But, as I looked at it, I was struck with the want of continuity of the reputed cancer, and with the greater mobility of the tongue than could have been expected in a case of cancer involving ever so little the floor of the mouth. And I said to the family medical man, "There is just a doubt in my mind whether that really is a case of cancer. Seeing how bad a case it is, if it is cancer, and how ill prepared the patient is for a large and severe operation, I would defer the operation for ten days, and give him very large doses of iodide of potassium." Both patient and doctor gladly agreed, with the result that the disease rapidly disappeared, and the patient made an excellent recovery,

so far as it was possible for him to do with an old scarred and disfigured syphilitic tongue.

I have never felt any pride at my success in this case, for I am sure that, had the patient not been obviously so ill, and had the disease been a little less extensive, I should have taken the diagnosis for granted, and have approved of the operation. The very badness of the case led me to pay more attention to points which might not have struck me otherwise.

iv. I have seldom passed through such alternations of hope and fear as in the case of a gentleman, between 50 and 60 years of age, who consulted me about two years ago. All the left half of his tongue was swollen and lumpy, as if from gummata, and there was deep fissured ulceration of the fore-part. There was a history of a primary sore more than twenty years previously, and the tongue presented such symptoms of tertiary disease that the diagnosis thus far was simple. But, some distance back on the left border, there was an ulcer more than an inch across, flat, with indurated border and base, not undermined, and not looking like an ordinary tertiary ulcer. This sore was said to have been occasioned by the rubbing of a broken tooth, and to have been present for about six months. The tooth had, of course, been removed, but the ulcer was not healed. Although the ulcer was not at all a typical tertiary syphilitic ulcer, it was not, on the other hand, cancerous in character. There was no decided sign of new growth other than might be explained by the gummatous condition of the left half of the tongue; there was no warty surface, and there was no heaping-up of the borders. Nor was there any enlargement of the corresponding lymphatic glands.

In the course of a week, under iodide of potassium, there was decided improvement, and the sore appeared as if it would heal. Then, in spite of a continuance of the treatment, and great care in diet, so far as he would take care, it grew more forbidding in appearance, and more indurated, until, at the end of a month from his first visit, it had so much the aspect of cancerous disease that I cut a fragment out of the most suspicious part of the border and submitted it to the microscope. Happily, there was no structure of cancer in the sections. I think that perhaps the fright, into which the patient had been thrown by the thought of cancer and of the operation he must

undergo, made him much more careful; for from that time he began to recover, and finally got well.

*Comments.*—I sometimes think that much more is made of the difficulty of diagnosis between syphilis and cancer of the tongue than it deserves. I do not feel sure that I have ever seen a primary sore upon the tongue, and I cannot therefore be sure that there might not be difficulty in making the diagnosis between that and cancer—the more so, because I have known two cases in which a primary sore was cut out of the lip in the belief that it was cancer. But, of these two cases, I am quite sure that the error ought never to have been made in the one, and I do not think there ought to have been such a mistake made in the other.

I never remember to have seen any case of secondary syphilis of the tongue which could reasonably have been mistaken for cancer, and the only condition in which there was difficulty was that of tertiary disease. As there is no question that cancer does sometimes develop in these old tertiary tongues, furrowed and disfigured by past and present ulceration, and that the signs of the new growth are likely to be confused and obscured by those of the old disease, difficult cases must necessarily occur from time to time—cases so difficult that the diagnosis cannot possibly be made with certainty. Even the examination of microscopic sections of a large fragment cut out of the border of the disease may not suffice to clear the doubt. Hence, there should be some rule of practice for the surgeon, and I confess I do not find it easy to lay one down. For myself, I should say that if, in an old syphilitic tongue, warts or warty growths, such as I have described as actual *pre-cancerous* conditions, form, they should be cut out without delay or hesitation. If a sore-place increases and becomes indurated, in spite of the administration of mercury or iodide of potassium, whichever suits the patient best, and in spite of care in diet and abstention from tobacco, it is safer to cut it out. If there is doubt in the mind of anyone whether operations on old syphilitic tongues will heal, I can safely promise that, provided the incision does not pass through tissues which are actually marked or infiltrated by syphilis, the wounds will heal as well as they would in the tongue of any other person of similar age and in similar condition. I

have many times operated on such tongues, and have never seen the wounds become like syphilitic ulcers.

Further, I would protest against the practice, which is far too common and too long continued, of trusting to a course of iodide of potassium or mercury to clear up the diagnosis, not only where there is no particular reason to suspect past syphilis, but even when the signs of past syphilis are well marked in the tongue. If an ulcer or disease of the tongue looks as if it might be carcinoma, developing in an old syphilitic tongue, a fragment of its border should be removed for microscopic examination. If the result of the examination is undoubtedly in favour of squamous-celled carcinoma, the disease should be at once removed. If the examination is negative, the patient should be placed on strict regimen and treatment; and, if within a fortnight of this and of the removal of any obvious cause of irritation, the disease is not decidedly improving, it should be at once removed. How many lives might have been saved if this rule had been observed!

### TUBERCULAR ULCERS.

v. A good many years ago, at St. Bartholomew's Hospital, a man came to my out-patient department with a small ulcer in the middle of the dorsum of the tongue of several months' duration. He seemed to be generally in good health. The ulcer was quite small, with an almost warty border, and very hard. It was absolutely indolent, and there did not appear to be any discharge from it; nor were the borders anywhere undermined.

I scraped some of the material from the surface, as I was accustomed to do at that time, and found epithelial cells in it, and some bodies which looked like cell-nests. Thinking it was an epithelioma, and in an early condition, I took the patient into the hospital and cut the ulcer deeply and freely out between two elliptical incisions, brought the edges together and obtained healing in the course of a few days. I was never more surprised than when I was told that the microscope had shown the structure of the sore to be tubercular. Fortunately, the operation had not been of larger extent than was desirable in a case of primary tubercle of the tongue, and there was no

affection of the glands, so that there had been no operation in the floor of the mouth. A few months later, the man came to the medical department suffering from spitting of blood, which was quite recent and was thought to depend on the presence of tuberculosis of the lungs. I do not know his further history.

vi. In 1888, a woman, 35 years old, was admitted under my care suffering from a flat sore on the right border of the tongue. It was opposite the first molar tooth, and was nearly an inch in length. Her age and sex, and the somewhat softer border of the ulcer, led me and many of my colleagues to regard it as tubercular. Perhaps we were influenced in our opinion by the case which has just been related, and which was also seen in consultation, and regarded almost unanimously as malignant. But, on removal, the ulcer proved to be epitheliomatous, and the patient died of affection of the glands, without local recurrence, two years and two months later.

vii. In 1896 a gentleman just over 60 years of age was brought to me on account of a flat ulcer of the right side of the dorsum of the fore-part of the tongue. Around the ulcer were old leucomatous areas, and there were similar patches on the inside of both cheeks and on the lower lip. He was a gouty patient, and a smoker, and had had some trouble in his tongue for many years, although it had never given him serious trouble; but the ulcer on the dorsum had only formed about two months ago. It was the ordinary form of flat epithelial ulcer, absolutely typical in its characters, and lay, as is common for such ulcers to do, in the midst of white areas of old standing. The disease was so marked and so simple for diagnosis, that the patient's medical man, who came with him, and I scarcely discussed the nature of the disease, and only considered the question of removal. There were no enlarged glands, and it was decided to remove the right half of the tongue to a point far behind the disease. This was done a few days later, when I cut into the ulcer, and found that it infiltrated the muscular substance of the tongue, but not to any depth. Sections were cut for the microscope and, when I examined them, I found to my astonishment, that the disease was typical tubercle, and did not contain a trace of cancer. There has been no recurrence of the disease; the glands have never been affected; and I believe the patient

still lives and enjoys good health. Certainly, he was alive and well not long ago.

viii. In 1898 I was consulted by a lady, 35 years of age, on account of a deep fissured ulcer of the dorsum of the tongue. It had raised, everted, indurated edges, and was as like to cancer as any ulcer of the tongue could be. Although there were no white areas visible on the surface of the tongue, there were some leucomatous areas far back on the inside of each cheek; and, as there was a history of some affection of the tongue which had been troubling her at times for several years, it was only reasonable to imagine that there had been chronic superficial glossitis and probably white areas where the tongue had now broken down. There was the greater reason to believe this because the patient was a very gouty subject. The ulcer had been noticed for a period of several months. One of her parents had died of cancer, not of the tongue.

I advised free removal of the tongue to a point far behind the disease; and, before submitting to the operation, another surgeon was consulted, who formed precisely the same opinion regarding the nature of the disease. As there was no palpable glandular enlargement, the disease in the mouth was cut out, and it was found necessary to delve deep down into the floor of the mouth to get beneath it. Again, when the sections were sent up to me, I found the typical structure of tubercle, and not a trace of cancer.

About a year and a half later a tubercular ulcer was cut out of another part of the body; but the patient was, a very few months ago, alive and well.

*Comments.*—Here, then, are four cases of mistake in the diagnosis between squamous-celled carcinoma and tubercle. Three of the four patients were seen by other surgeons besides myself, and there was scarcely any doubt in the mind of every surgeon who saw the disease that the diagnosis was correct. Looking back upon the cases, I do not know how it would have been possible to avoid the error. Certainly, there was nothing in case v. to suggest that the disease was other than carcinoma. Of case vi., I remember that I was influenced partly by the age and sex of the patient, but also by the presence of several little yellow points on the surface of the ulcer; but I also remember

that my colleague, Mr. Savory, took a different view from most of us at the consultation, and spoke in favour of the diagnosis of carcinoma—largely on the ground that, had the patient been a man and older, we should, almost all of us, have believed the disease to be carcinoma, not tubercle.

In the seventh and eighth cases, it seems to me now that there was no possibility of avoiding the error of diagnosis except by the removal of quite a large fragment for examination; for, there is so much epithelial or epithelioid tissue in the borders of many tubercular ulcers, that it is quite conceivable that the examination of sections from a small fragment of the border might leave the diagnosis of carcinoma rather confirmed than negatived. In both these cases there were the ordinary predisposing conditions of the mucous membrane to cancer, and there was no general or specific reason in either case to suspect the presence of tubercle. I am afraid that, so far as the diagnosis of primary tubercular ulcers of the tongue is concerned, we are no better off than we were twenty-five years ago, when Nedopil described the disease from an examination of three or four cases of primary tubercle of the tongue, in all of which the disease had been cut out under the full belief that it was carcinoma. So far as I am aware there were no associated conditions or signs of tubercle in any of the cases which I have just related. There was no affection of the lymphatic glands, which might have been expected even earlier for tubercle than for malignant disease, and there was really nothing to point to the diagnosis of tuberculosis.

Fortunately, there is no better treatment for primary tubercle of the tongue than free excision. Unless the glands are obviously enlarged, there does not seem to be any reason for removing them. Hence, if the general rule which I have suggested, of removing malignant disease of the tongue and the apparently sound glands at two separate operations, be accepted, there is no fear that a larger and more dangerous operation than is necessary will be performed; for, before the operation for the removal of the glands, the diagnosis will have been certainly made by an examination of sections of the disease of the tongue.

# A FEW LESSONS FROM FIFTY CASES OF OPERATION FOR CARCINOMA OF THE TONGUE.

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## PRE-CANCEROUS CONDITIONS.

The course of time and additional experience have increasingly impressed upon me the unsatisfactory—I had almost said the scarcely creditable—nature of the results attained by us in cancer of the tongue, especially when the advances in other operative fields and the improvements in modern dentistry are taken into consideration. Any one inclined to dispute the truth of the above should attend the collection of patients at any of the examinations of the College of Surgeons. Here, every three months, will be seen one or more typical advanced epitheliomata of the tongue, typical in their aspect and character of base and edges—typical in the constant salivation, the exquisite tenderness, and constant pain; while the enlarged glands, either plainly visible or easily found on bi-digital examination, the aspect of the patient from the long duration of conditions which impair nutrition, the pain, the impeded mastication and deglutition, and the auto-infection from the poisons constantly inhaled and swallowed, are typical also and complete the picture. The reply will be that these advanced too-late epitheliomata are the patient's own fault, and so it is in a large measure. But I wish to point out that in the great majority of cases—over three-fourths of my own, both hospital and private—other conditions are present as well as the epithelioma, showing an earlier stage out of which the cancer has arisen, and on which it has developed, creeping on with a remorselessness only equalled by its sureness and the ample time which has been given, but neglected, for dealing with the mischief easily and with permanent success. I allude to the evidence of former chronic glossitis, long-standing and clear to see, which the tongue, and often the cheeks, palate, and lips, show—in the form of patchy baldness where the protecting papillæ have long ago disappeared for ever, the bluish-white or white-

paint-like smears and patches of leucoplakia, the fissures, and the areas, at one spot depressed, at another elevated and lumpy, pointing to old ulceration.

The tongue has well been said to "always clinically speak the truth" (Dickinson, *Lumleian Lectures*, 1888). How many truths have here been neglected by the patient who comes, not always broken down and worn out, but often vigorous and in the prime of life, to seek, perhaps to urge, that operative relief, the hour for which has gone by? It is quite fair here to use the term neglect. There are some external cancers which we, as long as human nature and human ignorance are with us, shall rarely get in the first or only favourable stage; I allude to cancer of the bosom or female genitals, or that beneath a long foreskin. But the pre-cancerous stages of the disease in the tongue, unlike those just mentioned, cry aloud to the patient, appealing to his eyes as well as to his sensations, month after month and year after year, by reason of the increasing discomfort which they bring about in speaking, eating, smoking, &c. Can it be truthfully said that we are free from blame in this matter? The tongue has a whole volume of prognostics written on its surface, known to medical men. Any careful student after a year in the wards is familiar with some of them, *e.g.*, the dry, brown tongue which tells that things are going ill with a patient the subject of septic pyrexia after a too-late operation for appendicitis, the large red "beefy" tongue of diabetes, often inclined to be raw, and several others. Are we equally careful in estimating aright the signs and omens of a tongue which is tending in the direction of cancer? Can it be said that, in these days of increasing knowledge, there is a corresponding increase in wisdom in estimating aright and in sufficiently enforcing on our patients the significance and peril of these pre-cancerous conditions? But on this subject of our responsibility I prefer to quote the words used by Mr. Hutchinson[1] more than thirty years ago: "The frequency with which old syphilitic sores become cancerous is very remarkable. In the tongue, in particular, cancer is almost always preceded by syphilis, and hence one of the commonest causes of error in diagnosis and procrastination in treatment. The surgeon diagnoses syphilis, the patient admits the charge,

[1] *Brit. Med. Journ.*, 1872, Vol. I., p. 5.

the iodide of potassium appears to do good, and the months are allowed to slip by in a state of fools' paradise. The diagnosis, which was right at first, becomes in the end a fatal blunder, for the disease which was its subject has changed its nature. . . . A general acceptance of the belief that cancer usually has a pre-cancerous stage, and that this stage is the one in which operations ought to be performed, would save many hundreds of lives every year. It would lead to the excision of all portions of epithelial or epidermic structure which have passed into a suspicious condition. . . . What is the man the worse if we have cut away a warty sore on his lip, and when you come to put sections under the microscope you find no nested cells? If you have removed a painful, hard-based ulcer of the tongue, and with it, perhaps, an eighth part of the organ, and, when all is done and the sore healed, a zealous pathological friend demonstrates to you that the ulcer is not cancerous, need your conscience be troubled? You have operated in the pre-cancerous stage, and you have probably effected a permanent cure of what would soon have become an incurable disease."

If anyone should ask, "What, to be precise, do you refer to by the term 'pre-cancerous' condition of the tongue?" I should reply that I mean certain conditions in which the disease before us is the result, to-day, but not necessarily this day next week, of irritation and inflammation only—not, as yet, one of epithelioma. The conditions to which I refer indicate a stage in which the disease, usually an ulcer, has reached a point from which it will never advance in the direction of healing, while it has not yet proceeded so far as to become epitheliomatous. That it will do so I consider absolutely certain in hospital patients, and in the great majority of private patients, when once any of these pre-cancerous conditions are established. While speaking thus, from my own experience, most emphatically, I do not mean that every subject of an established pre-cancerous condition of the tongue will necessarily have cancer, but I do maintain that the exceptions are extremely rare. And few of us will agree with one of the most brilliant writers of the present day that, outside fiction, "an exception disproves the rule."[1] It is possible that a patient by uninter-

[1] A. Conan Doyle: *The Sign of Four*.

mitting carefulness as to diet, digestion, smoking, &c., may live out his days. It is only by taking these precautions that the subject of pre-cancerous conditions of the tongue can say that he is safe. And how many will take the needed precautions, day by day and year by year?

I will quote two cases. Mr. L. was sent to me by Mr. Cressy of Wallington in 1886,17 years ago, being then 49. He had had syphilis severely, 25 years before, and had been careless as to early treatment, as too many are still. His tongue was then the seat of widespread secondary syphilis. He was employing inunction very irregularly. To give an instance of the treatment, or rather the irritation, to which this long-suffering organ may be subjected, I may add that Mr. L. was very fond of wild-fowl shooting, and whenever the cartridges of the gun in his duck-punt used to jam, he would smear them with the mercurial ointment which he carried about with him; and then, thinking that as long as it was inunction it mattered little where, he would smear some of the ointment on his tongue and go on with his favourite sport. At his first visit to me the results of the old glossitis were so manifold as to make me write, "A very anxious condition for the future." The anterior two-thirds showed three long-healed fissures, one median, two lateral, the median one ending in little tags or knobs of scar-tissue. Near the tip itself one of these was warty. The surface and sides of the anterior two-thirds showed leucomata of varying date, but none of any thickness. At the junction of the middle and anterior thirds on the left side was an ulcer which had begun in the spring of 1885 or nine months before. This ulcer had healed and broken down again. Under the use of the acid nitrate of mercury locally—the only caustic which I would allow to be used to any dangerous tongue, and then only by skilled hands, *i.e.*, not by chemists or by the patients themselves—and lotions of sod. bicarb., borax, and hyd. perchlor., the tongue healed and remained sound. A few years later the patient was able to fill his place as Master of one of the City companies, though the quantity and quality of his meals gave rise to no little surprise, not unmingled with pity and contempt. Such cases are, however, quite exceptional. It is to be especially noted here that the patient was not a smoker. He was thoroughly alarmed at his condition, and

most amenable in carrying out advice in every detail. Further it will be noted that we do not know what may yet happen to the patient though he remains well: he is now about 66, and each year finds him with ageing tissues and scars of lessening vitality.

Much more often the result of such cases is to drift on, living as they please, and to end as the one reported by Mr. Hutchinson.[1] "One very obstinate patient who refused my urgent recommendation that he should have the whole tongue removed because there were several separate places which looked very suspicious lived for at least three years without any malignant development. He visited many of my surgical friends, and always expressed his satisfaction that by disregarding my recommendation he had saved his tongue. His fate found him, however, at last. He never consulted me again, but one morning a medical friend, acquainted with the facts, drew my attention to a newspaper notice of his death, and I found on enquiry that he had died after an operation for cancer of the tongue. He would have been a gainer by what some might deem a premature operation, for (let alone the final result) his tongue had been a trouble to him during the whole interval."

The first lesson which my cases teach me is that patients with cancer of the tongue still too often come for relief when it is too late, and to our share in the responsibility for this delay I have alluded, and shall do so again. The second point which I gather is that the origin of the disease and its earlier stages are much the same now as they were 20 to 30 years ago. I will allude to them one by one.

I. *Bald Tongue.*—Here the chronic glossitis has resulted in wasting and destruction of the protective papillæ. Like the filmy form of leucoplakia this is best seen when the tongue is dried with light touches of a pocket handkerchief. The epithelium is abnormally thin, and the subjacent corium is over-vascular and liable to be infiltrated with cells of the "indifferent" type. Thus is readily explained the liability of bald tongues to become raw, and then to pass into actual excoriations and ulcers in any rank of life. In hospital patients we have to contend with the irritation of coarse food, bad

[1] *Brit. Med. Journ.*, 1891, Vol. II., p. 1249.

alcohol, and repeatedly inhaled strong, hot smoke. But patients of a better class, who have learnt to avoid hot, spiced, rich food, and things that are sharp and sour, and who take only sound alcohol well diluted, have to learn further lessons. They are often employed indoors, all day, in business and in large towns. They are thus liable to indigestion, and can never understand how it is that, living carefully as they do, their tongues are still a source of anxiety to them. These patients have to learn that the avoidance of the above sources of irritation is not enough. They must avoid anything approaching to indigestion, and this usually means that they must earn their food by open-air exercise. If the excuse is that "I really have no time," the reply is, "You must make that time if you will avoid cancer." If means and inclination admit of it, the City man can get a ride after breakfast in the park and another before dinner. One with smaller means can get a daily walk or bicycle-ride by joining the up-train at a later station and leaving the one that brings him back at an earlier one. We all of us know the signs by which habitual indigestion shows itself on the tongue, but many of us have yet to learn what power habitual indigestion has, when the food, though restricted and taken in moderation, has not been earned, of increasing and perpetuating the trouble of bald tongue and other early pre-cancerous conditions.

II. *Ulcers, Cracks, Fissures.*—I take these together and gather the following practical points from my cases: (*a.*) In the great majority, fully 75 per cent., these, like other pre-cancerous conditions, have been due to syphilis. In a very small minority have ragged teeth or ill-fitting and loose tooth-plates been at the root of the mischief. (*b.*) While the typical gummatous ulcer, often median, of 20 years ago is now hardly ever seen on the tongue, the more superficial gummatous ulceration is as common as ever, pointing probably to a hurried, insufficient primary treatment, or the too early giving of iodides instead of mercury, the former drugs bringing about a temporary disappearance of the disease, but not curing it. Were I asked in what cases I should insist on a full two years of continuous treatment with mercury, I should reply—(1.) In cases where syphilis has early attacked the tongue and mouth; (2.) in medical men; (3) in those engaged to be married.

As to treatment: In syphilitic ulceration of the tongue, as in the leg if of any standing, it will only end in disappointment if specific treatment internally is trusted to. Syphilis was the cause originally, but in the tongue, as in the leg, other perpetuating conditions (*e.g.*, irritation, congestion, a mild degree of septic inflammation) have been superadded, and the time for internal specific remedies has gone by. I have found two remedies of real use in obstinate rawness, excoriation, and ulcers approaching a pre-cancerous stage. One is the acid nitrate of mercury, to which I have already referred. Used as recommended by Mr. Hutchinson I consider it a very sheet-anchor in the above cases. I look upon it as the best of all local remedies, and have often succeeded with it where the usual ones—borax, glycerine, chromic acid, &c.—have failed; and, more than this, I take it as one of my guides in treatment, and if acid nitrate of mercury fails I am inclined to take the fact as an indication for operative treatment. The part being carefully dried and kept free of saliva, the acid is applied with an appropriately-cut bit of wood, or glass rod, according to the size of the raw patch, ulcer, fissure, &c., while with the other hand and a bit of blotting-paper any excess of the acid is at once removed. Where there is ground for believing that any syphilitic element still remains active—though, as I have said, my experience leads me to look on this as very rare in pre-cancerous conditions—Mr. C. Heath's method of "pickling" the tongue will be found useful. As Mr. Heath insists with his usual terse common sense, telling a patient to use a mercurial lotion and then at once to spit it out again is absolutely futile. He should be told to hold some such lotion as this: hyd. perch. ¼ to 1 gr., honey ½ oz., water 1 oz., in his mouth for five minutes by the clock, breathing through his nose during the stated time.

III. *Leucoplakia or Leucoma.*—While very occasionally due to habitual irritation with tobacco, alcohol, &c., these patches are from my cases almost invariably the result of syphilis. Bluish-white when thin, and when thicker resembling smears or layers of white paint, they may become cancerous in two ways: each of these proves the importance of keeping such patients under regular observation at definitely ordered times,

and the non-observation of such precautions explains how readily hospital patients drift from the pre-cancerous stage into epithelioma. · (1.) A leucoma, usually a thin one, may become persistently raw. This condition is analogous to the intractable rawness which follows on a balanitis, usually gouty and non-venereal, and, hidden under the contracting prepuce of a patient past middle life, leads on into epithelioma. (2.) A leucoma may be converted into epithelioma by a lump or knot of induration occurring in it. This patients have often likened to "a pea." This mode of change is a graver one than the first. Rawness will sometimes yield to the regular local treatment already mentioned and the assiduous avoidance of smoking, unwise food, &c. This is not so with the leucoma which becomes lumpy or knotty at one spot. The lump or knot here is cancer and nothing else (*vide infra*, p. 612). No treatment will affect it, and, furthermore, the lump or knot is *beneath* the mucous membrane, and thus it is nearer to the lymphatics. These will be opened into when it ulcerates and breaks down, with the inevitable result. (3.) The leucoma may become warty. This condition, most incorrectly called by some "ichthyosis," is of importance clinically, because the intervals which exist before a leucoma passes into the stage of wartiness, and this, again, into epithelioma, may be prolonged—of a fallacy here I shall speak very shortly—and this leads patients to go on deferring the hour of seeking treatment. Another clinical point is that the greater density and the more irregular and projecting surface of these warty leucomata render them more subject to irritation, and thus —sooner or later, according to the amount of irritation to which they are subjected, and the resisting-power of the tissues —to eventual cancer.

IV. *Warts.*—Considering the naturally papillomatous structure of the covering of the tongue, it is striking how rarely warts are met with here. In the healthy tongue this may be in part accounted for by the constant friction to which the organ is subjected throughout the day. In the diseased tongue the nature of the disease explains why warts are rare as a pre-cancerous condition. From my experience the disease is nearly always syphilis, and syphilis is usually destructive. Where syphilis is constructive and raises warts, these are

nearly always restricted to the posterior third of the tongue, the explanation of this lying, in Mr. Hutchinson's opinion, in the fact that this is the region most exempt from pressure. In one of my cases, a man of 38, I was able to trace a distinct sequence between the so-placed warts of secondary syphilis and epithelioma.

The chief forms under which warts may present themselves, and, if neglected, pass on into cancer, are the following: (*a.*) The simple wart, rare as stated above. The ones which I have met with have usually been on the dorsum, though I have met with two on the floor of the mouth. Excision of warts on the dorsum, especially if situated at all far back, should always be followed by a suture of sterilised salmon-gut; otherwise the oozing from small vessels difficult to secure may be dangerous, especially in patients with chronic bronchitis. I lost one such patient six years ago from neglect of the above precaution. The warty patch was quite superficial, but elongated and sessile, median in position and on the posterior third of the tongue. I did not use the cautery owing to the proximity to the air-passages. Three salmon-gut sutures would have saved the patient's life. These should be left a little long to admit of their readier removal. (*b.*) A distinctly congenital form, dating to a nævus of the tongue and sometimes combined with it. Such congenital papillomata should always be removed early. If they are allowed to remain and become epithelomatous, owing to their vascularity the changes and intermediate stages are sudden and short, and ulceration with its results rapid also. (*c.*) The warts starting in secondary syphilis (*vide supra*). (*d.*) The warty or papillomatous form which epithelioma sometimes takes from the first. Rare though this be, and more favourable than the early ulcerating form, it is easy to see that epithelioma, once begun, would prefer to grow downwards into the soft and vascular tissues beneath. A rare but very important variety of epithelioma commencing in the warty form was shown by two of my cases, in which the growth took the form of a warty indurated mass situated in the middle of the posterior third of the tongue and surrounded by a circular ulcer, no doubt, denoting an origin in one of the circumvallate papillæ. This is a much less common form than

that attacking the tongue further forwards, but it is an infinitely more serious one from the difficulty of access to it, and at the same time the close propinquity of the wide lymph-paths with which the back of the tongue is abundantly furnished.

With regard to the treatment of warts on the tongue the rule should be to excise them with a margin varying according to their size and depth, and then to suture the wound with sterilised salmon-gut. Local applications rarely serve. Chromic acid is, in my experience, only of use when syphilis is present and still active. If acid nitrate of mercury be used it should only be employed once or twice, and in the case of the smaller ones; otherwise the growth may be cultivated into cancer. Ligaturing the base, still too often employed, is to be condemned.

Again. it is only in suspicious warty growths, as in suspicious excoriations, and leucomata and ulcers which are still suspicious only, that partial removal of the tongue will be sufficient, and the patient should, in these cases, be watched at regularly-stated intervals for a year afterwards. Where there is any reason to think that the pre-cancerous stage is already passed, and that epithelioma is present, I believe such a step to be full of risk owing to the fact that this disease, though superficially limited to one half of the tongue, may have crossed the middle line more deeply.

V. The last pre-cancerous condition of which I shall speak is that of *old persistent glossitis with numerous sulci and chronic enlargement of the tongue.* This is not a common variety, but it is an extremely important one. The tongue is large, swollen, deeply fissured with sulci, both longitudinal and transverse, over almost its whole extent, the numerous intersecting sulci enclosing areas of tissue which are more or less indurated, this feature being due at first to the interference with the blood-supply by the contracting tissue. It is often puzzling at the first visit of the patient, and is always a matter of anxiety and ill omen. I have only had one case of these big tongues with numerous sulci and intervening areas of altered solid-feeling tissue under my care, and here operation was refused. It was one to fix a clinical picture indelibly on the memory. The man, aged 42, was under my observation many years ago at Guy's Hospital for over a year. As long as he allowed

himself to be seen regularly, such lotions as those of sodæ bicarb. and borax, with attention to diet and smoking, kept his tongue healed and quiet and himself in comparative comfort. After an absence of five weeks he returned complaining of soreness at one spot; an excoriation was found here at the bottom of one sulcus. This condition persisted. Operation was refused; submaxillary lymphatics quickly enlarged; and when the man was last seen about four months after his return to me his end was clearly not far distant. The way in which a pre-cancerous condition here so rapidly passes over the borderline and becomes a cancerous one may be accounted for by the number and depth of the sulci. These are lined by thin scar-tissue, and thus at any time, if septic food should lodge in one of them, its removal is rendered at the best doubtful owing to the alteration in the tongue and the loss of its supple mobility. After a time an excoriation and an ulcer are certain to follow, just as a similar result may follow if a septic pellet of fæces be allowed to lodge for a time between two of the columns of Morgagni in the anal canal. In the latter case the severity and novelty of the pain in defæcation lead the patient to seek early relief; in the former the patient has for some time, it may be for years, had discomfort with his tongue, and is as familiar with the variations in this from time to time as with the abnormal aspect of the organ. Time is needed for him to become convinced that the pain, now due to a hidden ulcer, is something more than his long-standing discomfort, and by the time that he is convinced the hour for a successful operation has probably gone by.

### DIAGNOSIS BETWEEN CANCEROUS AND PRE-CANCEROUS CONDITIONS.

Considering the importance of early operation and the way in which patients shrink from it it is fortunate that difficulty does not often arise here. As a rule the medical man is sure enough in his own mind as to the nature of the case, but is not firm enough in enforcing this view and in closing loopholes suggested for escape by the patient. From mistaken kindness or want of firmness the former waits, and by waiting in these cases the patient's death-warrant has too often been signed.

The two conditions in which difficulty is most likely to

be present are: (1) an ulcer, whether this be pre-cancerous or actually cancerous, and (2) a leucoma becoming warty or lumpy.

(1.) *An ulcer.* Is it pre-cancerous or cancer? We will take the case of an ulcer, originally, perhaps, syphilitic in origin, situated on the margin and adjacent dorsum of the middle third of the tongue, and evidently of some duration, though on this point the patient, especially if a hospital one, rarely tells the truth. The question of again resorting to specific treatment arises. Here again too often the patient, desirous of shifting the full responsibility on to someone else, gives us no reliable information as to what has been already done. Before this question is settled, I would urge a careful weighing of the remarks made at the beginning of this article on the time often thus wasted and the temporary, partial and evanescent improvement often brought about in these ulcers by iodides. We will suppose that it is decided to give mercury and iodides. The best methods and the duration of their employment are points on which the medical adviser should hold firm conviction. With regard to mercury, if there be a case in which inunction has advantage, it is here. The patient, if in easier circumstances, suggests perhaps a visit to Aix la Chapelle. This should be absolutely discountenanced as a grave waste of time, and also quite needless. At Aix la Chapelle the method of inunction is admirably carried out, but much of the benefit gained there is due to the enforced regular regimen and life, and consequent improvement in the digestion which has such a beneficial effect on diseased tongues. The duration of specific treatment, including one or two applications of acid nitrate of mercury (p. 610) should not exceed one week in cases where the disease, if still pre-cancerous, has been so for some time. If there be still any doubt, operation is the right course. As will be pointed out there is no well-defined and wide border line between pre-cancerous and cancerous affections of the tongue and elsewhere. It is infinitely better for the patient to submit to an operation, even an extensive one, for a condition which is still pre-cancerous than to lose the opportunity, very likely a brief and fleeting one, and drift on into the too-late stage, a condition which will ultimately make both himself and those about him long for the inevitable end.

I have put specific treatment first, because it is one which first occurs to the mind of the medical man, and which will always be resorted to as long as human nature is what it is. For myself I have found it a failure in these pre-cancerous conditions of the tongue, as the activity of the syphilitic element has died out and been replaced by conditions resulting from chronic irritation. Far more valuable as an aid in diagnosis and treatment is the duration and obstinacy to previous treatment, if any. And here one point is of value to me. However unhelpful or misleading the patient may be on these points, if firmly checked in irrelevant, careless, and contradictory statements and advised to use his memory carefully, he will be able to give some information of value as to when the ulcer was healed last. Ulcers which are syphilitic, and not yet pre-cancerous, heal repeatedly, though they break down again and again. The true cancerous ulcer never does. If an ulcer has remained unhealed for three or four weeks in a patient over 40; if it has been and is likely to be constantly subjected to the usual irritation; if especially, the patient be of hospital rank, I advise operation. And the more an ulcer tends to creep down the side of the tongue and to affect the floor of the mouth, the greater I consider the suspicion, and certainly the more urgent the operation. As to the hardness of the base and edges, it has been stated that not only may non-malignant ulcers, even those due to teeth, show as much induration as an epithelioma, but more, an actual epithelioma may present itself without induration. After large opportunities I have never seen anything that justifies the former of the above statements, though I have of later years come to believe in the truth of the latter, as will be seen in one or two remarks which I shall make shortly on the pathology of these pre-cancerous and early epitheliomatous conditions. With regard to the second of the above statements, a gentle, firm pressure with finger and thumb while the tongue is at rest in the mouth, and again when it is carefully drawn out with the other hand and the edge of a pocket-handkerchief, the patient being at the same time asked to hook back the corner of the mouth, will usually elicit at one spot and that perhaps a small one, hardness, which means infiltration and infiltration only, localised amidst the surrounding softer delicate tissues; and

if it do not elicit it, it will raise strong suspicions. I cannot too forcibly impress on the minds of those responsible for these earlier stages that while we talk, and rightly, of the need of, and difficulties in arriving at, a correct diagnosis, all we can arrive at sometimes are suspicions, and when these are well grounded, they are enough for our purpose.

With regard to other aids in the diagnosis, viz., indolence as to pain, or presence of pain (especially shooting pain), tenderness, liability to bleed, and fixity or loss of suppleness, while I inquire into them, I attach but little importance to them. Some of them are too variable, according to the individual and points in the clinical history of the case, while others, if waited for, would mean waiting until too late. In a few cases which still remain doubtful, or where the patient is especially obstinate, microscopical examination will be justifiable. I do not recommend it. I consider that it is very rarely needed; that it is of limited application (*i.e.*, to ulcers); that it may easily miss the very spot which it desires to reach, if this be small; that it may lead to further delay instead of clearing up the case. Finally, perhaps, it is not without risks of its own. Mr. Butlin, however, and Mr. Spencer take an opposite view (*Diseases of the Tongue*, 1900, p. 342), and I will give their views first: "This method should be employed in every doubtful case. It can be used in most instances with success, even when there is no ulceration. The reason which leads us to speak so strongly in favour of the microscopic examination is that we have seen many cases in which carcinomatous ulcers have been treated as syphilitic ulcers by some of the best clinical surgeons in London, not because they felt sure that the disease was syphilitic, but because they could not feel sure whether it was cancerous or syphilitic. Weeks were allowed to elapse in this manner, until the ulcer had clearly shown that it was not in the least affected by anti-syphilitic treatment, and perhaps had implicated the lymphatic glands. The period at which it should have been removed was allowed to pass, and the operation was undertaken when the prospect of ultimate success was exceedingly small, and when the patient was weakened by the use of large doses of iodide of potassium, and in one case by mercurial salivation." The method is as follows:—The surface of the ulcer must be

gently and thoroughly cleansed of all discharge, *débris*, &c. A 20-per-cent. solution of eucaine is then applied to the most suspected part for a few minutes, and then one or more bits are taken with a small very sharp pair of scissors curved on the flat. In the words of the above-mentioned writers these "bits can be hardened very quickly in absolute alcohol, embedded in paraffin, and cut in serial sections, so that not a bit of the piece is lost. If time presses, quicker methods may be adopted: the piece may be boiled in a test-tube, sections cut with a freezing microtome, and quickly stained.

"If the result of the examination is negative, and yet the case is clinically suspicious, another piece should be cut away for examination. The first piece cut away may be a mass of inflammatory granulations where the small round cells have overrun and obscured the epithelial growths."

I have for many years abandoned this method, for the following reasons. If Dr. Newman[1] is correct in his belief that after such removal of bits for microscopical examination from doubtful growths of the larynx he has seen a sudden change in the rate of the disease, and rapid involvement of the glands follow, this method is not without serious risks in the case of patients who are unable to decide on adopting the only safe course. If malignant disease be found in the small bits removed, operation should follow without delay. But will malignant disease, if present, be always found by the microscope? I doubt it. In these cases of much doubt—and it is only in them that this method is justifiable—the actually-malignant area will be small and limited. Were it otherwise there would have been no difficulty in the diagnosis. In such doubtful cases after operation many sections may have to be cut before the epithelioma is found. With certain patients—and the unwillingness to submit to operation here is well known—the above must be remembered before this aid to diagnosis is resorted to, otherwise the patient hearing that no "cancer" was found, and failing to attach importance to the terms "suspicious" and "pre-cancerous," may go on deferring operation; just as another, hearing that the X-rays have not localised his renal calculus, may defer operation on almost as inadequate grounds, but with a less grave result.

[1] *Malignant Disease of the Throat and Larynx.*

I will remind my readers of two cases mentioned by Mr. Hutchinson in his *Archives of Surgery* in which the microscopists stated that no malignant disease was present in the bits submitted to them, yet malignant infiltration of the glands followed.

For the above reasons, and because as one gets older one tends to rely more and more on the clinical aspect and history of the case, and on one's own experience of similar ones rather than on the microscope, I have not for years resorted to the latter as an aid in diagnosis. I believe I am correct when I say that no mistakes have followed with regard to epithelioma from my not doing so. But it is right that I should add that, in one case, resorting to a microscopical examination might have prevented my making a mistake, though, as the disease proved to be tubercular, this mistake was of less importance. The patient was a gentleman between 40 and 50; the ulcer was situated in the middle of the right side of the tongue, the edge was not undermined, and though the induration present was not typical, as it did not amount to that of infiltration, it was to my mind extremely suspicious. Neither the surface nor the adjacent parts showed any of that caseation or minute yellow patches which are suggestive, if not indicative, of tubercle. Of this disease there were no signs elsewhere. I looked upon the disease as distinctly pre-cancerous and advised its removal. This was done by Mr. Symonds, and microscopical examination showed typical tuberculosis. My mistake was the less excusable here as I was familiar with the fact that many years ago Mr. Butlin, in his lectures on "Sarcoma and Carcinoma," drew attention to the impossibility of diagnosing between carcinomatous and tubercular ulcers of the tongue in the most difficult cases, accentuating this by the statement of Nedopil that all the four primary tubercular ulcers which he had seen were cut out on the assumption that they were cancerous.

### TREATMENT OF PRE-CANCEROUS CONDITIONS.

When, for reasons already given, there is ground for believing that the above are present, there is only one course, and that is to operate; to operate when in doubt,

and to operate early. When those who see these conditions early will be firm in impressing on their patients these three points: (1.) that the condition is one surrounded with peril; that it is certain to pass into actual cancer, if it is not then doing so, the border-line being very narrow and ill defined; (2.) that the speech afterwards will be all-sufficient for the needs of the patient; (3.) that an operation in this earlier stage is a safe one and attended by rapid healing—when these points are put forward as certainties, and not with hesitation and doubtfulness, then, and then only, will our operations on the tongue and their results become creditable to us. When a firm line is taken and we cease to hedge and hesitate, where our knowledge would lead us to one decision and one only, we shall see fewer of these grievous too-late cases which, as I have said, ultimately make not only the patient, but also those around him, long for the inevitable end. I refer to those cases which have become inoperable, or where from delay even the widest possible operation has been nullified by local persistence of the disease; where the pitiless, incessant aching of tongue, ear, and face, lit up into positive agony by a touch, by the endeavour to say a few words, or by swallowing saliva, render our palliative treatment of no real avail; while by the fœtor and the profuse foul salivation the patient is not only a source of poison to himself, but one of noisomeness to others. And I would also mention those cases where, after an extensive, but again too-late, operation, though there be no local recurrence, the glands are extensively involved, causing huge, disfiguring masses on each side of the neck, rendering it impossible for the patient to appear in public; especially when, as often happens, epitheliomatous ulceration takes place here also, and dressings are needed. It has happened to more than one of us, probably, in these too-late cases, to hear suicide discussed; and which of us, when watching the closing in of these needlessly lost lives, with week after week bringing days without hope and nights without rest, has not longed earnestly for a wider recognition of the pre-cancerous stage of tongue-cancer and for earlier operations in it?

PATHOLOGY OF PRE-CANCEROUS CONDITIONS.

(1.) With regard to the peril of these cases and the certainty that they will become cancerous I have already spoken. I would add a few words with regard to their pathology, which bears on the above.

We are all aware that a squamous epithelioma consists of down-growths of the inter-papillary processes of epithelium as finger-like projections, which finally reach the normal boundary between the epithelium and the sub-epithelial connective tissue, and thence, owing to the less resistance now met with, along the connective-tissue spaces which are the commencement of the lymphatics. But we do not, many of us, sufficiently remember the fact that in the pre-epitheliomatous varieties of disease just the same conditions in an earlier stage are always present, waiting only for some impetus, some slight increase in irritation, &c., to start at once into actual epithelioma. It is this indubitable fact in pre-epitheliomatous conditions and in commencing epithelioma —the propinquity of the disease to the tissues in which the mouths of the lymphatics lie open—which proves the incorrectness and worse of teaching, as has been the case, that epithelioma is a slow form of cancer, and thus more favourable than others. I believe that if a large number of cases of epithelioma of the lip were taken, and still more of the genitals—in fact of squamous epithelioma anywhere—the results, if honestly watched and noted, would be startling in their unfavourableness. Whether it be a pre-cancerous ulcer leucoma, or wart, whether it be a wart on the lip or genitals, the microscope shows a similar tendency of the interpapillary processes to dip downwards towards what we may call the dangerous area. There is no definite border-line between these conditions and epithelioma, and what boundary there is may be passed both insidiously and suddenly and rapidly. As Mr. Butlin and Mr. Eve showed long ago, this tendency of the interpapillary processes to dip down is present at some distance from the pre-cancerous condition and the epithelioma, at points where the mucous membrane or skin appear, to the unaided eye, to be absolutely healthy. Hence the need to operate sufficiently widely, so as to get beyond the area where the change in the interpapillary processes is commencing.

Another point which my cases teach me is that conditions apparently only pre-cancerous and quiescent may be actual epitheliomata, and that infiltration of the glands may follow when a cure has been hopefully spoken of. I do not know all the conditions in which this fallacy may be present, but I do know that in some leucomata and some warts epithelioma may be present though there be no fissuring or ulceration of the surface and, apparently, a state of quiescence similar to what has existed for years. We have yet to learn how often conditions apparently innocent, or at the worst pre-cancerous, may be in reality already malignant. One such condition is seen as I have shown on the tongue, another certainly occurs with pigmented warts on the skin. These may implicate adjacent gland-groups, while to the unaided eye quite unaltered and quiescent. My attention was first drawn to this fact four years ago in a patient, aged 33, sent to me with apparently tubercular, not yet caseating, glands low down in the right anterior triangle. On removal the glands were found to be the seat of melanotic sarcoma, not tuberculosis. The only source of this was a small mole free from all inflammation and quite quiescent. Its apparent insignificance had led to my overlooking it. The patient was alive and stated to be well a year after the operation. Since then, owing to her moving, she has been lost sight of. Mr. Eve in a clinical lecture on "Melanoma" recently published in this journal,[1] has drawn attention to two other cases of melanotic papillomata becoming dangerously active without giving external signs.

One more word. We talk of epithelioma being a disease of later life when the resistance and vitality of the tissues are growing less. Three of my cases were under 40. It cannot be too distinctly remembered that these tongues, with the usual history of syphilis and further constant worry and impairment of the delicate tissues by coarse, cheap alcohol, and strong, hot tobacco, must show degeneration and premature ageing long before their day.

### POWER OF SPEECH AFTER REMOVAL OF THE TONGUE.

(2.) The second chief point on which those who see these cases early need to be emphatic and convincing is as to the

[1] THE PRACTITIONER, February, 1903, p. 165.

power of speech which patients will retain. While urging early operations in patients whose speech is not yet hampered by pain, commencing fixity, &c., medical men must be most decided as to the usefulness of the organ left. The ignorance and dread met with in patients and their friends as to the loss of speech, when facing an operation, is not unnatural; but any doubt or hesitation on our part is not creditable to us, as it ought to be well known that the surgery of the tongue, however imperfect in its permanent results for cancer, has proved to demonstration that ample power of speech may be retained after complete as well as after partial removal of the organ. Every operating surgeon is familiar with this fact, and it cannot be too widely known, and the well-founded comfort of it clearly put before patients. I will mention one case of my own, one of many, but as clear in its proof as a case can be. It is that of a former army surgeon, aged 63 I had removed the entire tongue. A median scar in the floor of the mouth was all that represented the operation performed. With his artificial teeth in place (without them he was most indistinct) the patient, some few months after the operation was able to speak so distinctly as to give a most interesting account of one of the most striking episodes of the Indian Mutiny. He had been one of the surgeons in the force with which Sir Colin Campbell, afterwards Lord Clyde, relieved the garrison of Lakhnao (*Anglice* Lucknow). While nearing that place, the English met and surrounded, killing some forty of them, two Sepoy regiments who were known to have murdered their officers. As the artillery ammunition was too valuable to be wasted, and as hanging would have taken up too much time, the court-martial assembled decided upon putting the mutineers to death in the following way. They were collected in groups of four, two facing in one direction and two in the other, and then a Minie bullet was fired through the four bodies. It would be impossible to have a more convincing and indubitable proof of the ability to talk without a tongue. Not only were the different details of those two fearful hours most clearly given—the narrator, who had seen many terrible sights, said that this was the worst of all—the rapidity with which retribution was meted out; the sandy plain; the soldiers with non-commissioned officers moving about under the blazing sun from group

to group of waiting dusky figures; the unshaken calm with which the Sepoys met the inevitable death; but more than this, such words as "Unao," "Bunni Bridge," familiar to those who have followed the deeds of 1857 and 1858, were perfectly intelligible.

To give another convincing case, Dr. W. T. Bull, of New York, removed the entire tongue, cutting through the base at the level of the hyoid bone and removing enlarged glands. Three years later the patient again entered the hospital for a broken leg. His speech was sufficiently clear not to attract attention; in fact, he was an in-patient two days before it was discovered that he had no tongue. The vowels were good, but g, h, t, m, ch were imperfect. Examination of cases of my own of extensive removal of the tongue has shown that t, d, th, j, g, and s have been very imperfect, if not impossible of pronunciation, and l, r, s, v, z not much better. In explaining the difference in these cases, the remains of muscles embedded in scar-tissue and still partially functional and under control, such as the hyoglossus and genio-hyoglossus, have to be taken into consideration, together with the mobility of the pillars of the fauces and uvula, the length of the soft palate as well as its mobility, and last, but not least, the condition of the teeth, artificial and otherwise.

### CONDITION AFTER REMOVAL OF HALF OF THE TONGUE.

As I have spoken of removal of one half of the tongue longitudinally as being permissible in pre-cancerous cases, I will briefly refer to the condition of the parts subsequently. On looking into the mouth the tongue will be seen to be constantly directed over to the side operated on by the unbalanced fibres of the other half, the tip especially being curled round and a little backwards. The mucous membrane on the side spared will be seen to be unusually lax owing to the constant dragging on it of the remaining tongue. When asked to protrude the tongue beyond the lips the tongue is pushed out to the lips, but owing to its tendency to curl round to one side, does not come beyond them. When asked to touch the hard palate with the tongue the patients can only do so when the teeth are half an inch apart, not when the jaws are more

widely separated. The voice in such cases is loud and ample, the speech clear and intelligible, save when one or two consonants, especially two dentals, requiring rapid touching of the incisors or hard palate by the tip of the tongue, succeed each other closely as in the word "literal." The degree of intelligibility left in these cases is well shown by the fact that one of my patients resumed his seat on a School Board after his operation.

(3.) The rapidity of the healing which follows an early operation on the tongue is too well known to need further remarks, but it is a source of solace which may be impressed on a patient naturally anxious when facing an operation on a part so sensitive as the tongue. The difference between an operation done under conditions, both local and general, favourable to rapid repair, and a necessarily much more severe one in a case verging on the too-late variety, in a patient broken down by suffering, and poisoned both generally and in his lungs, by the auto-infection, from a septic ulcer, is as wide as a difference can well be.

(*To be continued.*)

# ON A SERIES OF CASES OF CANCER OF THE TONGUE.

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FOR the purposes of this paper we have collected the cases which one of us has had in hospital and private practice during the 12 years 1891–1902 inclusive, and have thrown them into the form of a table, upon which our remarks are based. We believe that every case in which the tongue was apparently the primary and chief seat of the disease has been included. The notes are often imperfect, occasionally, perhaps, incorrect; but a good deal of trouble has been expended upon them by the surgeon, who often alone knows the state of matters and exactly what has been done. No one who studies the table will think that the cases recorded in it have been selected with an eye to statistics: the conclusion will probably be that more cases should have been rejected. As a matter of fact, operation has been refused to very few.

When we started upon this investigation we certainly hoped for results less disappointing than we have found. It was time to consider the cases carefully, and to endeavour to improve upon the past.

We have 34 cases, in 27 of which some part of the tongue other than the frænum was the primary seat of the disease; in 7 the frænum seemed to be first affected. Taking first the *Tongue-cases* (27) we find that the first (No. 1) was recurrent after operation at Guy's Hospital. No microscopic examination is recorded; if the growth was an epithelioma, the course of the case was unusual. The man has not been traced, so the case is of no value and will not be reckoned.

The remaining 26 cases were all primary when they came under treatment.

One case (No. 2), a woman, remains well 11 years after operation. The growth and its treatment were of the simplest kind. An anterior, marginal ulcer of 10 weeks' duration was freely cut away. A small gland at the angle of the jaw was evidently regarded as having no connection with the growth and no gland-operation was done.

In two cases (Nos. 8 and 9), the patients have died of causes other than cancer, after 6 and 4¼ years respectively, being free from obvious cancer at the time. In No. 9, a feeble man of 75, the superficial growth of seven weeks' duration was removed freely, no gland-operation being done. In No. 8, again, the growth was recent and the tongue in no way fixed by a filbert-sized growth in the middle third: here a fairly extensive submaxillary operation was added to the removal of the growth.

Case No. 10 we regard as having been freed from a cancer on the right side of the tongue, and as having developed a second distinct cancer on the left side of his mouth. When first seen this man had a "considerable" ulcer on the right side of his tongue, not involving either the free edge or the floor, not crossing the mid-line and not impairing the mobility of the tongue. The mucosa between it and the frænum was red and irritable. The right submaxillary glands were infected. A free local operation was done, and three submental glands were found and removed together with all the submaxillary set. For 5¼ years this patient remained free. Then he returned with a superficial epithelioma of the left side of his tongue — quite separate from the scar of the former trouble (which was normal) extending to the floor and gum; the ulcer was one inch from before back. The left submaxillary glands were hard; the right neck was normal. A thorough clearance of the left submaxillary and upper carotid regions was effected; the lip and chin were split in the mid-line, a cheek-flap turned back, and the epithelioma, the infiltrated sublingual gland beneath it, and the piece of jaw subjacent to the affected gum, were removed. After nine months he had recurrence in the floor of the mouth and just behind the notch cut in the alveolar process. The lip and chin were divided through the old scar, the jaw sawn near the mid-line, the halves separated. The tongue was cut longitudinally, ⅓rd inch from

TABLE.—

| No. | Name. Sex. | Age. | Duration. | Condition on Admission. | | |
|---|---|---|---|---|---|---|
| | | | | General. | Local. | Glands. |
| 1 1891. | Haines. *M.* | 66 | Wart 26 years. Infiltration began 8 years, removed 6 years ago. Slow recurrence at once. | ? | Hardish nodular growth, not ulcerated at left end of tongue-scar: not infiltrating floor, nor tongue deeply. | ? |
| 2 1892. | George. *F.* | 45 | 10 weeks. | Good; "flesh lost rapidly lately." | Ulcer, size of shilling, on left edge: apparently anterior and not infiltrating much. | Small one felt at angle of jaw. |
| 3 1893, Feb. 4. | Powell. *M.* | 48 | 3 months. | ? | Ulcer beneath right edge, in molar region, infiltrating tongue deeply and fixing it. | One right upper carotid. |
| 4 1893. Sept. 30. | Hatton. *F.* | 61 | Leucoplakia 14 years. Ulcer 4 months. Growth on alveolus 6 weeks. No history of syphilis. | Good. | Leucoplakia and bald patches over anterior two-thirds. Tongue-surface very irregular. Ulcer, size of shilling, on right dorsum in front, infiltrating deeply and fixing tongue. Warty growth on 1½-in. of toothless lower alveolus and on floor of mouth for same distance behind symphysis. | Right submaxillary probably enlarged |
| 5 1894, Apr. 26. | Hart. *M.* | 47 | 14 days. | ? | Ulcer, size of shilling, right side, ½ in. from tip, extending to floor and fixing tongue. Dorsum healthy. | ? |
| 6 1894, July 7. | Murphy. *M.* | 54 | 2 months. Cauterised several times. | ? | Oval ulcer, 1 in. long on right edge, opposite site of wisdom tooth and on anterior pillar: induration two-thirds across tongue. | Both submaxillary felt. |
| 7. 1894, Oct. 13. | Spicer. *M.* | 53 | For 10–11 months broken molar irritated tongue. 3 weeks pain and swelling. Tongue sore on and off for 10 years. | Good. | 1 in. ulcer from opposite right molars to ¾ in. from tip; not reaching midline. Tongue well protruded. | One right submaxillary. [Two removed were not diseased (microsc.).] |
| 1895, Oct. 19. | — | 54 | Swelling at right angle 1 week; discomfort longer. | Better; flesh gained since operation. | Tongue normal. Swelling felt — not seen — below right angle of jaw. | — |
| 1896, Mar. 28. | — | 55 | Less than 3 months. | ? | Large mass behind right angle of jaw and some smaller ones. | — |
| 8. 1894. | Bagster. *M.* | 54 | 2 months. | Stout, alcoholic; cirrhosis of liver. | On right edge in front of anterior pillar an ulcer ¾ in. by ½ in., with filbert mass in tongue. Freely movable. | Right submaxillary suspicious. |

## TONGUE CASES.

| Operation. | Recurrences. | Result. |
|---|---|---|
| Removed freely with scissors - - - - - - | —— | Not traced. |
| Removed freely: sutured; gland not touched - | —— | March 1903 (11 years). Strong and very healthy. No trouble with tongue. |
| 2 small submaxillary and 2 large upper carotid glands removed. Ulcer removed by cutting from one-third back on right edge nearly to mid-line and nearly to epiglottis. Access was unsatisfactory. | Recurred - - - - - | Died of recurrence (site unknown) in 6 months. |
| Submaxillary lymphatic glands on both sides, and one submental removed through curved cuts starting below angles and meeting below symphysis. Lower lip and chin divided, flaps turned back to masseters, central 3 in. of jaw removed with floor of mouth and anterior half of tongue. Cut ends of bone fixed apart by two stout silver-wire spanners. | Recurred in 6 weeks on right side of tongue: more removed. Soon after this both right and left upper carotid glands swelled. Nothing more done. | The wire spanners healed in, and a photograph shows a good chin. But lower lip was drawn behind upper by scar-contraction. |
| 1 large and several small right submaxillary glands removed, with salivary. Mucoperiosteum elevated opposite ulcer. Tongue divided along centre and cut through on right behind ulcer. | 7 months later: recurrence *in loco*, in right submaxillary region (ulcerating), and left submaxillary and cervical glands. | Too extensive for treatment. |
| Right Kocher's cut: submental, submaxillary, and 2 upper carotid glands. Right half of tongue removed back to hyoid through submaxillary wound. Some of left base, the right tonsil and part of right soft palate removed also. | 1 month later: rapidly growing epithelioma on edge of wound in palate. Wide removal. | Inoperable recurrence noted on return from convalescent home. No note. |
| 3 submaxillary glands (not the salivary) removed, "with all connective tissue." Upper carotid glands not "felt"; left. Ulcer removed with scissors. Good margin. | Recurrence 1 year ater. See below. | —— |
| 2½ in. cut on to anterior edge of sternomastoid. Mass of glands, 1¼ in. by 1 in. by ½ in., removed from beneath parotid and sternomastoid, one chief gland containing epithelial foci (microsc.). 3 or 4 quite small glands near removed. | Recurrence 6 months later. See below. | —— |
| 3 in. cut on to sternomastoid. Mass removed adherent to carotid sheath and posterior belly of digastric and sternomastoid. Portions of the jugular, common, internal and external carotids removed with it. | Recurred. In 2 months there was an epithelioma at *left* base of tongue and left upper carotid glands were swollen. | Died Dec. 1896, 9 months from last operation. |
| Submaxillary and upper carotid glands removed. Right half of tongue removed with lower end of anterior pillar. | —— | Died nearly 6 years later of uræmia and hæmorrhage from the stomach. |

| No. | Name. Sex. | Age. | Duration. | Condition on Admission. | | |
|---|---|---|---|---|---|---|
| | | | | General. | Local. | Glands. |
| 9. 1895. | Skinner. *M.* | 75 | 7 weeks. | Feeble. | Leucoplakia, warty mass, "size of 2 walnuts" on right edge, dorsum and under surface. Covers 2 in. back from tip. Little induration. | A right submaxillary felt. |
| 10. 1895, Jan. | Haslam. *M.* | 55 | 2 months. | Healthy. | "Considerable" ulcer on under surface of right half, not involving floor or free edge, not crossing midline. Infiltration moderate, movement not impaired. Irritated area across frænum. | 2 or 3 submaxillary, mobile, hard. |
| 1900, May. | — | 59 | 6 weeks. Soreness and roughness of tongue; 8 teeth drawn; no good. | — | Right edge, except tip, adherent to floor; normal. Superficial epithelioma of left side, floor and gum, 1 in. from before back. | Left submaxillary hard and swollen, on right none. |
| 1901, Feb. | — | — | 1 month. Soreness. | — | Small swelling in front of coronoid process close to where V of bone was excised. In floor of mouth opposite this an ulcer 1 in. by ½ in. indurated. Tongue free. | No glands. |
| 11 1895, Mar. | Nicol. *M.* | 58 | 3 months. Bitten on tongue by parrot at site of ulcer 6 months ago. | ? | Ulcer size of shilling on left edge and dorsum in middle third to ½ in. from midline. Moderate infiltration; mobility good. | One left submaxillary, and one upper carotid. |
| May | -- | — | —— | — | Hard, slightly adherent gland at angle of jaw—slight prominence. | |
| 1896, Feb. | — | 60 | —— | Very ill. | Tongue swollen, hard and fixed. Ulcer on left extending across mid-line, and far back. | Numerous in all parts of neck: most on left. Liver 3 in. below ribs. |
| 12 1897. | Coulson. | 57 | 3 months' pain. | Fair. P. 116–124. Cause? Temperature normal. | In tongue opposite right tonsil and anterior pillar a mass less than pigeon's egg: mirror showed no ulceration. Anterior pillar involved below. Growth not fixed. | Fulness about right angle of jaw, one submaxillary gland felt and deep to jaw a nearly fixed mass. A gland (chestnut) opposite cricoid. |
| 13 1897, May. | Walker. *M.* | 52 | 11 weeks. Flesh lost 7 weeks. | Good. | Bossy mass, in anterior part of tongue chiefly on right. It crosses midline and is 1½ in. from before back. Little ulceration. No note of mobility or state of floor. | No glands distinctly felt; probably some on right. |
| July | — | — | — | — | Hard, filbert-sized gland in left upper carotid region, just where first operation stopped. | — |

| Operation. | Recurrences. | Result. |
|---|---|---|
| Cocaine. Right half removed with scissors to behind growth. Wound sewn up. | — | Died 4½ years later of bronchitis and emphysema. |
| 3 submental and 3 submaxillary removed. None *felt* posterior to submaxillary salivary gland. 4 teeth drawn. Mucosa elevated from jaw opposite ulcer. Ulcer removed with scissors; also "irritated" mucosa across frænum. Good margin. | Recurrence or fresh growth? See below. | Remained free for over 5 years. |
| Left Kocher's cut. Thorough clearance to upper carotid region. Removal of growth on tongue, floor of mouth, and sublingual gland (infiltrated), and gum with all bone subjacent—a bar being left below—*after reflection of cheek.* | Recurrence in 8 months. See below. | — |
| Lip cut through in old scar, jaw sawn in mid-line. Tongue cut ½ in. from left edge and ½ in. from ulcer to well behind it. Alveolar process cut away to behind growth ½ in. above lower border, and all growth removed with a good deal of tongue-muscle. | — | March, 1903 (2 years). "I am in good health, and my mouth is all right, so far as I know." |
| Left submaxillary region cleared and gland at angle of jaw removed. Lingual tied. Tongue split down middle, and left half removed wide of growth. | At angle of jaw 2 months later: see below. | |
| 3-in. cut on to sternomastoid edge. Gland felt lay deep to parotid opposite transverse process of atlas. Removed with one smaller and higher and several lower along vein. Latter seemed sound. | In tongue and glands 8 months later; see below. | |
| — | — | Inoperable recurrence. |
| 5-6 in. cut along right sternomastoid; another, forwards above hyoid. Fat and glands removed along great vessels from beneath digastric almost to clavicle; also back some way into post-triangle. Big gland lay outside jugular and burst in removal. Submaxillary region cleared. Lingual tied. Right half of tongue removed through mouth fairly completely. Dyspnœa early necessitated laryngotomy. Neck-wound gauze-drained. Tube retained till 5th. | — | Death on 5th from septicæmia? Slight jaundice on 3rd, delirious on 4th night, temperature 100-102, pulse 118-132, respiration, normal. P.M. neck-wound communicated with mouth, right vagus surrounded by pus, œsophagus full of pus, internal jugular thromboses for ¾ in. opposite common facial vein. |
| Double Kocher. Right lingual tied. Submaxillary wounds closed. Growth removed through mouth from behind left tip obliquely backwards and to right. Right sublingual gland removed. Good margin in all directions. | In 2 months in left upper carotid region, see below. | — |
| Incision along whole length of sternomastoid; gland felt adhered to sheath of jugular, common facial, and digastric; was dissected off, apparently cleanly. Glands and connective tissue removed from behind whole length of jugular and back into post-triangle. | In 4 months in right neck and slight in left, see below. | — |

| No. | Name. Sex. | Age. | Duration. | Condition on Admission. | | |
|---|---|---|---|---|---|---|
| | | | | General. | Local. | Glands. |
| 13—*cont.* 1897, Nov. | — | — | — | Good | Tongue free. Rather fixed mass beneath right submaxillary flap. Smaller mass opposite thyrohyoid space, probably fixed to carotid sheath. On left, indefinite hard mass about site of main gland dissected off in July. | — |
| 14 1897, Aug. | Browning. *M.* | 52 | 6 weeks ulcer. Syphilis 20 years ago; tongue sore 18 years ago; caustics: more or less trouble since. | Good. | Tongue covered with leucoplakial and bare patches. Ulcer, the size of sixpence, on right dorsum, ½ in. from tip from mid-line to edge, which is "glossy." | One right submaxillary enlarged; another, left, smaller; others small, hard, at left angle of jaw. |
| 1898, June | — | — | 5 weeks, mobile lump. 2 weeks, got fixed and grew fast. Much pain. | Good. | Hard walnut mass adherent to right jaw, reaching down to hyoid and up to floor of mouth (mucosa free), 2 or 3 small upper carotid glands. | — |
| 15 1898, Jan. | Chave. *M.* | 52 | 5 months, tooth chafed tongue. Syphilis 31 years ago. Tongue sore in first year, not since. 1 month's anti-syphilitic treatment useless. | Good. | On left edge near tip a bald red patch, then an epithelial thickening, culminating posteriorly in a small hard-edged ulcer—a long oval, 1 in. altogether surrounded by leucoplakial ring. | No glands. |
| 1902, Nov. | — | 57 | Five weeks' pain 3 weeks' rapid swelling. | Good. | 1½ by 2 in. swelling, very tender, adherent to left sternomastoid just above clavicle. Temperature, 99°–100°. Fluctuation under anæsthesia. | — |
| 16 1898, June. | Banks. *M.* | 42 | Six months' "sore throat." | Good, 13 lbs. lost. | Swelling of extreme back of visible tongue, more on right than on left. Base indurated from side to side; an ulcer in midline can just be felt and can be seen with laryngoscope. Cords concealed by contact of swollen base and epiglottis with spine. | A long swelling along vessels behind left angle of jaw. Obscure swelling opposite right great cornu. |

| Operation. | Recurrences. | Result. |
|---|---|---|
| l right submaxillary flap raised; mass adherent anterior belly of digastric removed; revealing eeper mass in wall of pharynx adherent to great rnu. Incompletely removed. Many enlarged lands beneath right sternomastoid, but no justifi-tion for trying to remove them. | — | Inoperable recurrence. Recovery and healing always rapid. Condition excellent at end. |
| ser removed with scissors, wound closed. Ex-vasation into tongue and floor; much pain. No land-operation done. | 10 months in right sub-maxillary region. | — |
| rge Kocher flaps. Removal of large softening land mass, with whole of salivary gland, anterior nd part of posterior belly of digastric, most of ylohyoid, anterior fibres of masseter, and a good yer of deep surface and free edge of jaw bared y removal of mass. Several slightly enlarged lands along spinal accessory removed. | Soon after discharge re-currence began. In 4 months (October 1898), a mass adherent to right jaw and numerous glands in right neck. | Inoperable recurrence. |
| thorough left Kocher. Lingual tied. About the ht third of visible dorsum removed, including val patch and all leucoplakia. | This patient was seen fre-quently. In December 1899, he and I thought a slight nodule in left submaxillary region had increased. Re-moved; only a deep bit of submaxillary salivary gland. In October 1901 leucoplakial patch near tongue scar; thick, tending to ulcerate. Removed, not epithelioma (microsc.). In July 1902 a submental gland, 4 months enlarged, was removed. No cancer found micro-scopically. In October 1902 recurred in left lower carotid gland. | — |
| edle drew off 5 dr. turbid fluid showing only eocytes. Incision, curetting, solid wall moved, proved to be epitheliomatous. Two eeks later whole mass removed with good gth of sternomastoid and of jugular; difficult, t growth was well surrounded by apparently althy tissues. | Sinus remained with free watery irritating dis-charge. Board-like indura-tion spread around. Flesh and strength lost rapidly. In January 1903 a gland-swelling appeared on right. Rest of neck apparently sound. | Inoperable recurrence low in neck 4¾ years after removal of primary growth. |
| athing stopped as anæsthesia deepened, tongue-traction useless, tracheotomy, larynx plugged om below with gauze.<br>ch cut on to upper end of left sternomastoid, lands and connective tissue along and outside essels removed. Similar operation on right; ly two glands near great cornu were enlarged. ght lingual tied. Pharynx opened by cut rough origins of hyoglossus and middle con-rictor up and back to great vessels; digastric ndon cut; right great cornu and bit of body of yoid excised. Ulcer seen behind circumvallate apillæ. Base of tongue and epiglottis in absolute ntact with spine; growth extended down an ch below hyoid, overlapping glottis. Tongue t across a finger's breadth in front of induration more removed on right than on left; detached om hyoid with curved scissors kept close to the ne; raised from glottis and detached from yroid cartilage by cutting epiglottis and mucosa; moved after division of mucosa and muscle aching it to left great cornu. The transverse ngue-wound was in great part closed by six tgut stitches through tongue and mucosa above yroid cartilage. Recovery easy. Fed by tube r 17 days. Swallowed quickly and well by th. At work two months after operation. | In October 1898 (4 months) submaxillary glands were thought to be enlarging; both spaces cleared; no epithelioma of glands found (microsc.).<br>In March 1899 (9 months) bad recurrence in right lower carotid glands. Re-moved with lower half of jugular vein. The clearance extended well back into the right posterior triangle, the sternomastoid being divided below.<br>In June 1900 (2 years) recurred deep to right sternomastoid about level of hyoid. Mass removed with superjacent piece of sternomastoid and glands and fat from posterior tri-angle. A firm nodule above mass was removed — the closed end of jugular. It and the mass were epithe-liomatous. | July 1901 (3 years)—works, eats, and sleeps well: no recurrence in throat or neck. 3½ stone gained since operation. Bad cough; sputum blood-stained yesterday.<br>August 2, 1902.—Last seen at hospital still complain-ing of bad cough; cause of cough not discovered. No recurrence in mouth or neck. After this date he did no more work Dyspnœa and dysphagia developed, and there was slight blood-spitting. He died September 23, 1902, 4¾ years from the first, 2¾ from the last operation. |

| No. | Name. Sex. | Age. | Duration. | Condition on Admission. | | |
|---|---|---|---|---|---|---|
| | | | | General. | Local. | Glands. |
| 17 1899, August. | Loft. *M.* | 62 | 10 months sore. | Very thin. Temperature, 97·6—100; 101·8 just before operation. Pulse under 100. Respn. normal. Nil in chest. | Infiltrating epithelioma of left half of tongue back to pillars of fauces and beyond midline. Left floor of mouth occupied by foul ulcer. Tongue fixed to jaw. Bled for 2½ hours after admission. | Hard left submaxillary mass, continuous with that in mouth. Large gland at left angle; another in right subclavian triangle. |
| 18 1900, May. | McKellon. *M.* | 62 | 8 months small sore, slow increase. | Good. | Ulcer on middle third of right dorsum, midway between edge and mid-line. Infiltration moderate, mobility of tongue normal. | ? |
| — 1901, April. | — | — | 5 months soreness. "Abscess" below right jaw a month later. | Poor. | A good deal of cancer in stump on right side. Sinus below right jaw, tissues much matted around; tongue nearly fixed, jaw not clearly felt. | 3 or 4 large left submaxillary glands. |
| 19 1900, June. | Nidd. *M.* | 47 | Tongue long tender. 2 years leucoplakial patch (?) which slowly spread. 8 weeks ulcer and pain. | Thin. | Ulcer, 1 in. by ½ in., markedly indurated, on left dorsum extending to right of mid-line; mobility good. Leucoplakial patches and fissures around. | Left submaxillary larger and harder than right. 2 soft upper carotid. Hard mass (pigeon's egg) attached to left sternomastoid at deep structures at cricoid level. |
| 20 1900, Nov. | Young. *F.* | 55 | 4 months white patch; glands, 2-3 weeks. | Thin; has lost flesh. No solid food 1 month. | Oval ulcer, 1 by ¾ in., on right dorsum two-thirds way back. Induration extends to midline, well on to posterior third, and forward along floor to frænum. Mucosa on jaw not affected. Tongue freely movable. | Right submaxillary and upper carotid. |
| 21 1901, June 2 | Stewart. *M.* | 51 | 3 months probably. He then had epithelioma of free part of epiglottis on left of mid-line removed at Golden Square, and nodule in tongue was noted. | Delicate. Scarcely recovered from previous operation. Wound was not healed on May 10. | Oval mass (=filbert in shell) reaching back to right anterior pillar and to near mid-line. No ulceration, only puckering of surface: no leucoplakia. Tongue not fixed: floor free. | Glands felt along both sterno-mastoids. |
| 22 1901, July. | Compton, *M.* | 52 | 13 months tender spot, attributed to sharp tooth. | Good; stout. | Large ulcer on posterior part of left tongue. Begins opposite 1st molar; ending cannot be seen. Extends little on dorsum, &c. Covers side of tongue and sulcus, but not mucosa on jaw. Infiltration moderate. | One small left submaxillary; small, upper carotid; [illegible] subparotid mass. |
| 1902, Jan. | — | 53 | 7 months. | — | Ulcer on back of tongue-scar, on anterior pillar, soft palate, and floor of mouth. | No glands. |
| 23 1902, Feb. | Rosa. *M.* | 52 | 18 months soreness in swallowing. 5 months lump in tongue. | Good; no loss of flesh. | Ulcer, size of a shilling, on left side of tongue, spreading on to anterior pillar and soft palate. | Subparotid and carotid down to thyroid cartilage. |

| Operation. | Recurrences. | Result. |
|---|---|---|
| Kocher's incision and long cut on to sterno-mastoid, submaxillary region cleared (mouth growth exposed), subparotid mass removed, and many other glands lower in neck and running back into posterior triangle. Upper half of jugular removed. Lingual tied. Plug over exposed cancer. | — | Death, on 6th, of bronchitis and broncho-pneumonia, tongue not having been touched. He did fairly up to 5th; then chest-signs and heart-failure developed rapidly. |
| ght submaxillary and upper carotid region leared (one submaxillary gland was epithelio-matous). Right lingual tied. Anterior two-hirds of right half of tongue removed, section assing to left of midline opposite ulcer. | Recurred in tongue in 6 months (November 1900). "Cheesy abscess" below right jaw a month later. | |
| as - - - - - - - - | — | Inoperable recurrence 11 months after operation. |
| & Kocher's cut, and another along sternomastoid 1 1 in. above clavicle. Submental and sub-axillary regions cleared. Subparotid and upper arotid glands and tissue removed: not obviously fected. The large mass was removed with herent sternomastoid, sternothyroid, and piece f jugular. Below this other glands; one, as rge as marble, burst. Anterior two-thirds of left ngue removed with scissors. Wounds sewn p; healed well. | Recurred; site unknown - | Died of recurrence not long after leaving hospital. |
| bmental (indurated) and right submaxillary lands removed; glands and connective tissue moved from vessels and behind vein from deep to digastric to cricoid. Right lingual tied. Mucosa elevated from jaw. Tongue divided down midline (on left of it opposite, ulcer) growth guarded, right half brought out into submaxillary wound and cut away near base. (Margin narrow behind and mesially.) | — | Death on 8th. Strength gradually failed after operation. Temperature subnormal, pulse rising. Wounds normal. Post-mortem.—Advanced inter-stitial nephritis. No en-larged glands found in neck. |
| ght Kocher's cut, submaxillary space cleared. st along sternomastoid: 2 of glands removed bought to be diseased. Lingual tied. Tongue rawn forward and anterior pillar cut. (Sudden yanosis required tracheotomy.) Right half with mour removed. Mouth-wound closed, except osteriorly, where it was impossible; cervical aze - drained. Tracheotomy-tube removed on ad. Had to be fed by tube. Did not recover ell. On 15th pleurisy: on 19th localised left eptic empyema drained. Improvement, but still reat weakness. Taken home on 32nd. | — | Died suddenly on 33rd, day after he went home. |
| cher's cut. Submaxillary region cleared. Two rge glands deep to digastric removed. Cut long sternomastoid, and "small soft gland re-oved low down." Small nodule in superior onstrictor removed. Left lingual tied. Mylo-yoid incised; anterior pillar divided; left half ngue and floor of mouth where involved, drawn t through submaxillary wound and divided at ase. (Satisfactory margin everywhere; upper arotid gland infected; lowest sound.) | Sore formed on back of tongue soon after discharge. See below. | — |
| eek reflected; jaw cut in front of ramus; growth tongue, tonsil, soft palate, and parts of stylo-lossus, superior constrictor and internal ptery-oid removed. | — | June 1902, died. Small nodule in tongue scar; glands on both sides of neck. |
| cher's cut, extended down along sternomastoid. ubmaxillary space cleared. Glands and con-nective tissue removed from vessels from bifurca-on of artery to mastoid process; also along inal accessory to external jugular. Some soft lands burst in removal. A week later, lip and hin cut in midline, left cheek turned back. Jaw sawn in front of ramus. Growth circumscribed with large argin; left half soft palate, left tonsil and anterior pillar, left half of hinder two-thirds of tongue removed. ttack of acute mania during convalescence.) | In 8 weeks (end of May) swelling in still unhealed neck wound — due to ruptured glands? Mouth healed; no recurrence. | Inoperable. Rapid growth. Death, November 1902. |

| No. | Name. Sex. | Age. | Duration. | Condition on Admission. | | |
|---|---|---|---|---|---|---|
| | | | | General. | Local. | Glands. |
| 24 1902, May. | Parker. *M.* | 68 | 5 months pain on swallowing and earache. 2 weeks submaxillary lump | Fair. Some loss of flesh. | Ulcer on left edge of tongue, floor of mouth and mucosa of jaw, opposite second molar (on removal, growth ran half-inch into tongue and invaded alveolar process). | Submaxillary small. (Sub- and lymph- glands rem- were not infe- |
| 25 1902, June. | Gouter. *M.* | 60 | Occasional pain in swallowing 2 years. 5 months constant. 9 weeks trismus. | Good. 20 lbs. lost in 4 months. | Opens mouth half-inch between incisors: protrudes tongue half-inch, to right. Ulcer on right side of tongue opposite third molar, induration size of almond; right anterior pillar and soft palate to posterior edge involved: examination difficult. | No gland (No infection after remov- |
| 1903, Jan. | — | — | 10 days swelling noted. | Good. Gaining weight. | Still small sinus from neck into mouth—large area of bare bone felt along it. Swelling just below cervical scar, 1½ by ¾ in., adherent to deep structures. | - |
| 26 1902, July | Adams. *M.* | 55 | 2 months pain in eating. 4 weeks sore noted. | Thin, fair colour. Had lost weight. | Tongue almost fixed. Ulcer 1¾ by ¾ in. on left side, reaching to anterior pillar and on to floor: infiltrating deeply (microscopically: malignant type). | None felt. S- maxillary and st- sternomastoid regions felt. (G- in both re- infected.) |
| 27 1902, Aug. | Rudd. *M.* | 75 | 18 months sore opposite rough tooth. 3 months submaxillary lump. 3 weeks swelling above clavicle. | Healthy. Has lost flesh. | Ulcer on left tongue from midline to edge, and from half-inch behind tip to anterior pillar. (On removal reported to infiltrate tongue ½—⅝ in.) | Fulness in s- submaxillary r- and beneath s- end of st- mastoid. T- adherent: h- 2 in. a- clavicle. (- reported fi- on remov- |

FRENU

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|---|---|---|---|---|---|---|
| 28 1893. | Lamont, *M.* | 58 | 6 months | Good | 1½ in. ulcer destroying frenum and eating equally into tongue and floor. Mass felt beneath anterior third of tongue. Moved slightly on jaw. Gum not involved. | Submental r- right and l- submaxill- |

| Operation. | Recurrences. | Result. |
|---|---|---|
| ther's cut: submaxillary, subparotid and carotid gion down to bifurcation cleared of glands and nnective tissue; also outside vein beneath upper rt of sternomastoid. Lingual tied. Cheek re-sted from midline. Saw-cut in front of growth. hole half of tongue, anterior pillar, adjacent or, and 1 in. of body of jaw external to growth moved. A bridge of lower edge ½ in. deep was ved and wired: it necrosed and caused much in, and late suppuration. | — | March 1903 (10 months). No evidence of recurrence. General condition good. Still some bare bone about cut jaw and pain. |
| ther's cut: submaxillary, subparotid and upper rotid regions cleared: glands all small. Others ng spinal accessory removed. Right cheek med back from midline. Wedge of bone, base n. just in front of angle, removed from jaw. owth had extended along coronoid process and er surface of maxilla. There were removed: ht half of tongue to hyoid bone, right tonsil, th pillars, part of side wall of pharynx, more n half soft palate; mucosa over tuberosity of xilla and coronoid process, anterior slip of tem-al tendon and bone deep to involved mucosa; me internal pterygoid fibres. (Wide margin all nd reported.) Easy recovery. Sequestrum parated after 3 months. Could separate teeth n., and masticate well. | In January 1903 (6 months) in neck. See below. | — |
| along sternomastoid: mass freed below and nside: adherent to vein which was tied, cut, nd stripped up. Mass now found adherent to rotid above: stripped from artery, vein tied and emoved. Its wall was infiltrated. | — | Recurrence in neck. Operation incomplete. |
| ther's cut: submaxillary region cleared A few nds along external jugular removed. A few nd glands removed from along upper part of ternal jugular and along eleventh nerve. Mouth d pharynx opened. Lingual artery tied. Lym-atic gland beneath hyoglossus removed. Tongue ught out below jaw and growth removed th ½ to ¾ in. margin. Neck-wound gauze-ined. | — | Died of septic pneumonia in October 1902 (3 months). Two large stinking cavities in right lung. Tongue healed: no sign of growth. Neck-wound not healed. No infected glands noted. |
| her's cut and submaxillary region cleared. A small glands along external jugular removed. along most of sternomastoid. Internal jugular and divided deep to digastric and turned m with adherent glands; sternomastoid cut inch above and half-inch below gland adherent it; vein tied again below mass and removed h it. Lingual tied. Left half of tongue moved through mouth. Recovery easy. | In right cervical glands about 1 month before death—very rapid. Tongue remained free. | Died March 2, 1903. In November 1902 (3 months) he was in good health. He was comfortable, and took food well to 5 weeks before death. |

SES.

| | | |
|---|---|---|
| t and left submaxillary salivary and lymphatic nds removed, also submental. 3 incisors wn. Mucosa elevated from symphysis, ulcer away with ½ inch margin towards tongue. | After 7 weeks in both anterior triangles. Right glands fixed, and, as then thought, inoperable. | Lost sight of with inoperable recurrence. |

| No. | Name. Sex. | Age. | Duration. | Condition on Admission. | | |
|---|---|---|---|---|---|---|
| | | | | General. | Local. | Glands. |
| 29 1893. | Smith. *M.* | 54 | ? | ? | Frænal ulcer extending to bicuspids on each side, not adherent to jaw but close to it. | ? |
| — | — | — | — | — | Much induration in floor, extending into tongue. | Left submaxillary certainly. |
| — | — | — | — | — | Swelling behind centre of sternomastoid. | — |
| 30 1894. | Searle. *M.* | 72 | 9 months | ? | Tongue very fixed: no ulceration visible. Hard. Not fixed to jaw. Notes very imperfect. | Masses in both submaxillary regions (glands were really not pushed down by mass of tongue). |
| 31 1896. | Rapson. *M.* | 68 | 2 months special soreness beneath tongue and lump in neck. Frequent soreness since syphilis 40 years ago. Quite mild condiments brought water to his eyes. 5 years ago plantar psoriasis and probably leuco-plakia lingualis. | Well nourished, ruddy, not looking his age. | Notes very imperfect. Ulcer, size of florin, destroying frænum, more on left than right, nearly reaching tip of tongue, involving alveolus on left. | Several submaxillary in both submaxillary and left anterior triangle. On left, gland (pigeon's egg) adherent to part around; on right, smaller, movable corresponding gland. |
| 32 1897. | Hedgeland. *M.* | 54 | 5 months. Much flesh lost. Daily bleeding last 14 days—"a lot" once. Lost a pint in two attacks after admission. | Thin, pale, and worn. U., P., and R. normal. | Floor involved in anterior two-thirds more on right than left. Deep ulcer extending from right edge of tongue across alveolus to outer sulcus from right lateral incisor to second molar. Tongue pushed to left and fixed on right. Swelling felt below right jaw and even across mid-line. | Right submaxillary fixed to growth. One left submaxillary felt. In carotid. |
| 33 1899, Dec. | Giles. *M.* | 50 | 6–7 weeks lump in tongue. Submaxillary glands 4 weeks. | Good. | Ulcer in floor from bicuspids to bicuspids, infiltrating tongue back to first left, second right molar. Dorsal mucosa normal; thin layer of soft tissue between it and growth. Jaw seemed free. | One right submaxillary. |
| 1902, Oct. | — | 56 | 5 months' swelling in mouth. 1 month lump in neck. | Good. | Tip of tongue sound; bound to floor. Ulcer, ¾ by ½ in., extended from midline of floor to left; fixed to inner gum. | Opposite left hyoid apparently 1½ in. mass fixed to sternomastoid and deep structures. |
| 34 1900, Nov. | Starke. *M.* | 47 | 3 months mass under tongue. | Good. | Growth, size of a shilling, on frænum and floor of mouth slightly adherent to jaw. Tongue well protruded; floor not deeply infiltrated. | Submaxillary gland felt, as usual, on each side. |

| Operation. | Recurrences. | Result. |
|---|---|---|
| Mucosa elevated from jaw, ulcer cut out. A small right submaxillary operation done. | Recurred in 7 weeks, see next line. | |
| Removal of left submaxillary glands, jaw between bicuspids, floor of mouth and all induration in tongue. Two stout wire-spanners to represent jaw removed. | Recurred in glands behind one sternomastoid in 4 weeks. No note after fortieth day from first operation. | Then, mouth-wound closing fast, wires embedded. No falling in of chin. |
| 3 or 4 almond-sized and several smaller glands removed; 1 wounded and clear fluid infected wound. Many apparently infected glands left along jugular. | — | Lost sight of, almost certainly with inoperable recurrence. |
| Several submaxillary glands removed with salivary glands on each side. Both linguals tied. Tongue removed through mouth — a mass of friable epithelioma. | — | Died on 5th. Hypostatic pneumonia. Stump of tongue "natural." No glands in neck. |
| Double "Kocher" with extension down along sternomastoids. Submaxillary and upper carotid regions satisfactorily cleared. Piece of left jugular removed with adherent softened gland which was wounded. Submaxillary wounds closed. Teeth drawn, infected alveolar edge cut away with anterior half of tongue and floor of mouth. | — | Death on 8th. Broncho-pneumonia. (Both submaxillary wounds suppurated: bronchitis: rising temperature.) |
| Double Kocher, carried further behind on right than on left. Both linguals tied. Lip and chin split and cheeks raised. Jaw sawn in front of right angle and through left second bicuspid, and removed with tongue and floor except mucosa of left floor and dorsum where not even overlapping hardness. Muscles cut in order at hyoid. Right coronoid process and mucosa over it removed. | — | Death unexpected on 11th. Mouth had been practically closed, and was almost healed. *Post mortem* Aortic incompetence. Pericardium generally adherent. Moderate interstitial nephritis (Dr. Wm. Hunter). |
| Double Kocher: removal of submental, submaxillary, and upper carotid glands on each side; latter seemed normal. Chin, lip, and jaw divided in mid-line, floor of mouth back to bicuspids and anterior third of tongue cut away. Recovery easy; sinus over stitch in jaw. | In May 1902 (3 years 4 months from operation) recurrence in floor. See below. | — |
| Gland mass removed with 1½ in. of sternomastoid and 2 in. of jugular veins. Good margin everywhere. A week later mouth growth removed, partly through mouth, partly through submaxillary wound. Gum elevated from jaw, ¼—½ in. margin. | In December 1902 (2 months) induration noted at site of last mouth-growth, free from jaw. | Recurrence; operation declined. |
| Double Kocher incision; submental, submaxillary and upper carotid spaces cleared. Chin, lip, and jaw divided in mid-line, growth removed freely with scissors, jaw wired, muscles and lip sewn together, submental wound drained. | — | Remains well, March 1903 (2¼ years). |

its left edge (½ inch from ulcer), the alveolar process chiselled off, and the ulcer in the floor completely removed with the tissues around and deep to it. It is over two years since this operation, and the patient writes, "I am in good health and my mouth is all right, so far as I know."

One other case (No. 24) is at present free from obvious cancer; but only 11 months have elapsed since operation. Besides the tongue, the floor of the mouth and the gum opposite the second lower molar were involved. A small submaxillary gland could be felt. The removal of the primary disease and its extensions seems to have been satisfactory; but in view of the five months' history it would have been safer to have extended the gland-operation down to the level of the cricoid cartilage at least. It is some comfort to know that the Registrar was unable to detect cancer in the glands removed.

We will refer next to two cases (Nos. 15 and 16) in which operation resulted in considerable periods of immunity. In No. 15 the disease seemed to be of the slightest kind. On the left edge, near the tip, was an oval patch about an inch in its long diameter, the posterior half of the patch being occupied by an early epitheliomatous ulcer. It was cut away with a surrounding ring of leucoplakia, and the left submaxillary and upper carotid regions were thoroughly cleared. The patient was anxious about himself, and attended frequently to be examined. After nearly two years it was thought that a slight swelling, which we had watched in the left submaxillary region, was enlarging; it proved to be a normal bit of the submaxillary salivary gland (deep part) left on the duct. After three years and eight months a leucoplakial patch near the tongue-scar, thick and tending to ulcerate, was freely removed. The epithelial layer was irregularly thickened, and its horny covering was in excess; deep to it the mucosa was richly infiltrated with round cells, but no invading epithelium was detected. Its removal could not, however, be regretted. A few months later a submental nodule (gland) was noted, which in four months reached a diameter of, perhaps, ⅓rd inch. It was then removed, and, again, no epithelium was found in it. Finally, 4¾ years after the removal of the small primary growth upon his tongue, a large very tender swelling, adherent

to the sternomastoid, formed rapidly just above the left clavicle, the rest of the neck seeming normal. It was hoped that the swelling might be inflammatory; but this was soon disproved, and an excision was carried out. Recurrence was immediate, a gland low down on the right side of the neck enlarged, strength failed rapidly, and he ceased to attend. On the 3-year limit, this case might have been counted as a cure!

The infection of the gland low down in the neck and the acute course of the disease in it are difficult to explain. Did the epithelial cells reach it by some unusual channels from the primary growth 4¾ years earlier, and lie dormant? Or was the leucoplakial patch, removed only one year earlier, really an epithelioma and the source of infection? One cannot help asking whether the submental gland also may have contained epithelium even though careful examination failed to reveal it. Could we answer these questions, we should at least understand how a cancer, apparently so trivial and so promptly removed, killed the patient.

We may contrast with this case another (No. 16) in which, although in some respects the worst in our list, we at one time hoped that we had succeeded in eradicating the disease. This man—alcoholic, but otherwise an excellent patient—had a cancer extending right across the true base of the tongue, absolutely out of sight, except with a laryngoscopic mirror. The tumour lay in contact with the spine in the mid-line, and breathing was apparently carried on through the lateral parts of the pharynx. It ceased entirely as anæsthesia became complete, necessitating tracheotomy. The growth extended from near the circumvallate papillæ to the epiglottis, which it infiltrated and perforated, there being an ulcer on its laryngeal aspect. It hung well down between the cornua of the hyoid bone and thyroid cartilage over the superior aperture of the glottis. Though the tongue-growth was larger upon the right than upon the left side, glands were more obvious beneath the left sternomastoid than in the right anterior triangle. Both regions were cleared, as described in the table, and the tongue-growth removed, together with the epiglottis, all but its point of attachment. There was thus nothing to prevent the discharges from the large transverse wound across the tongue from running straight into the larynx. We, therefore, think

that the almost complete closure of this wound, which was effected by purse-string sutures, must have been an important factor in warding off septic lung-complications; but the man's strength and wiriness, pluck and determination to get on, were most helpful. Recovery was practically uneventful. Ability to swallow ordinary food easily at the end of a month was more than we had ventured to hope for. Soon there seemed to be no need for special care to prevent food from going "the wrong way."

After four months an apparently unnecessary submaxillary operation was done; but in nine months he reappeared with a bad recurrence in the glands along the lower half of the right jugular vein, beginning just where the first operation ended, and extending well towards the clavicle. It was met by the removal of the lower half of the vein with a wide area of gland-bearing tissue. Not for 1¼ years was there any more trouble; but then a mass adherent to the sternomastoid formed in close relation to the upper cut end of the jugular vein. It was freely excised. Again, everything seemed satisfactory, and 13 months later he looked strong and well, had gained 3½ stone since the first operation, and said of himself "I work, eat, and sleep well." But the reason of his visit was that for a fortnight he had had a bad cough, and the day before the sputum contained blood: no cause of cough and hæmoptysis was found, and as he always had chronic pharyngitis and a husky voice, we did not think seriously of it. He continued his work for more than a year, the cough persisting. At the end of this time, it seems, he had to give up work; dyspnœa and dysphagia supervened, and there was slight hæmoptysis. He died 4¼ years from the first and 2¼ years from the last operation—presumably of intrathoracic recurrence. His son wrote to us that "after death a lump showed just under the ribs on the right side." The first operation stopped the disease in the mouth and on the left side: had a little more been done *then* upon the right side, all might have been well. But it will be remembered by way of excuse that affection of glands on the right side was decidedly less obvious than upon the left.

One other point: At the first operation, the right hypoglossal nerve was preserved. To do this it was dissected

free for some two inches or more in a wound which was necessarily infected. When all had healed, one noticed on looking into the mouth only that the fauces were somewhat narrowed and that the right half of the tongue was wasted. The tongue could be well protruded, but went markedly to the right. Slowly this improved, until, two years after the first operation, it was noted that the tongue was symmetrical and was protruded in the mid-line. If a result such as this can be frequently attained, it would be worth while preserving the nerve for the sake of any muscle supplied by it which might properly be spared, *e.g.*, the genio-hyoid.

This is the small measure of success or partial success which we are able to report among our tongue-cases. The rest ended in death or early recurrence.

*Deaths.*—The mortality has been very heavy, 5 deaths (Nos. 12, 17, 20, 21, 26) having occurred in direct relation to the operation, though possibly not all from it. Thus it would seem likely that No. 17 was, at the time of operation, already suffering from broncho-pneumonia, though examination failed to detect it. The chief reason for operating upon so bad a case was that repeated serious hæmorrhage had occurred, and was most difficult to check. As it still seemed possible to remove the whole disease, this course was chosen. Owing to his weakness—attributed largely to loss of blood—the glands only were dealt with at the time that the lingual artery was secured; the mouth was not interfered with in any way, the tongue and involved jaw being left for a later occasion. In any case, the operation can have acted only as a general depressant.

With regard to No. 20, the cause of death some time ago would have been filled in unhesitatingly as "exhaustion." Exactly what to substitute for it in this case is not clear; but she died because she was operated upon.

Nos. 12 and 26 were both bad cases, requiring grave operations—especially the former, in which a laryngotomy was performed, the pharynx being plugged and the tube retained to the day of death (5th). In 12 the cause of death seemed to be septicæmia; in 26 it was a long-drawn-out (three months) septic broncho-pneumonia.

The death of No. 21 is that most to be regretted, for the

growth was sufficiently recent and limited to justify the hope that it might be completely extirpated. Tracheotomy was necessitated, the tube being removed within 24 hours. The cause of death was an empyema which was drained; possibly his removal from hospital was a contributory cause.

This case was apparently an instance of the almost simultaneous development of two epitheliomata close to, but distinct from, one another. The man was sent to Charing Cross from the Throat Hospital, Golden Square, where he had his epiglottis removed by subhyoid pharyngotomy (with tracheotomy) for an epithelioma on the *left* side of its laryngeal aspect. At this time (three months ago) a nodule was noted on the *right* side of the dorsum of the tongue in front of the anterior pillar, and this developed into the filbert-sized, not ulcerated mass with which he was admitted. We have already expressed the belief that in No. 10 the growth, which appeared upon the left side of the tongue and mouth five years after the healing of the first operation-wound on the right side of the tongue, was a fresh development; and in this connection we may draw attention to case No. 7, in whom a rapidly-growing, infiltrating epitheliomatous ulcer developed in the left base of the tongue—away from the scar of the original right-sided operation, which remained sound—18 months after the removal of the first growth. Here, too, there is ground for suspecting that the later was not "secondary" to the earlier cancer. If our inference is correct, and the occurrence of three such cases in our table is not wholly exceptional, a "tendency" to cancer-growth in the mouth would be indicated, for which we were not prepared.

We have now dealt with 12 cases out of 26: 1 is alive and well (11 years); 2 died, 6 and 4¼ years after operation, free from obvious cancer; 2 are free from obvious cancer at the time of writing—one 8¼ years after removal of a cancer on the right tongue and more than 2 years from a second operation for a cancer upon the left side of the mouth; in the other, 11 months only have elapsed from the operation; in 2 cases life seemed to be considerably and usefully prolonged—4 and 5 years—but one (No. 15) is dying of certain recurrence in glands low in the neck, and the other (No. 16) most probably had some intrathoracic and possibly hepatic recurrence (died

in the country). 5 cases died; 4 soon after the operation—1 apparently from septicæmia, 1 from "exhaustion" (?), 1 from empyema, 1 from broncho-pneumonia. The 5th case died of broncho-pneumonia from a foul mouth after a gland operation only.

*Recurrences.*—In the 14 remaining cases the disease recurred quickly: in only 1 of them (No. 7) did a year elapse between the first operation and recurrence. Under this heading of recurrences, ultimately proving fatal, must of course be included cases Nos. 15 and 16, already dealt with, making a total of 16 cases in which the disease recurred and was not successfully dealt with.

### FRÆNAL CASES.

In 7 cases, a cancerous ulcer affected the frænum and adjacent parts. Of these, 1 (No. 33) remained free for 3¼ years and then recurred; 1 (No. 34) is at present sound, 2 years and 4 months from the operation. 3 died (Nos. 30, 31, 32), 2 recurred—No. 28 in the anterior triangles, No. 29 *in loco* and in glands.

No. 34—the only case now free from cancer—was the least advanced of the series; but having the history of No. 33 before us, No. 34 can by no means be regarded as out of danger.

No. 33 had a considerable amount of local disease, though probably not quite so extensive as the statement under this heading would indicate; otherwise the operation done would have been obviously inadequate. Just when a believer in the 3-year limit would have been talking about a "cure," a recurrence took place in what must have been scar-tissue. Unfortunately the man allowed 5 months to elapse before applying for treatment.

Both these cases were treated by the gland-operation (bi-lateral, of course), which we now regard as minimal, and then by median division of the lip, chin, and lower jaw, separation of the halves, and removal, under the eye, of the primary growth. This is certainly the most satisfactory method we have yet tried. Even after free extraction of teeth, access to the base of a frænal ulcer through the mouth is most unsatisfactory, and it is impossible to *see* what is being cut (Nos. 28,

29, and 30). Access is improved by removing the alveolar border (No. 31). We have never tried to approach the growth from below, as this would involve unnecessary injury to the digastric, mylohyoid, and geniohyoid muscles, with a considerable probability of infecting from the primary growth the cut ends of the muscles, past which it must be drawn with force capable of expressing much epithelium from the growth. After median division of the jaw, all is clear and the geniohyoids need not be interfered with, unless they come within the danger-zone.

When the symphysis seems to be seriously involved it is easy to raise cheek-flaps as far as may be necessary and to cut out the infected bone. This was done in 3 cases (Nos. 4, 29, and 32). In two instances (Nos. 4 and 29) an attempt was made to replace the chin by two arches of stout wire, the ends of which were inserted in holes drilled in the sawn surfaces of the mandible. The wires healed in in both cases, and the prominence of the chin was preserved. Unfortunately opportunity for observing was short (2 months and 40 days).

In cases 28, 29, and 30 (1893-4), the gland-operation was not nearly free enough, and the immediate result in 28 and 29 proved it.

With regard to the 3 deaths, No. 31 was the only one due to a cause special to mouth-operations. The hypostatic pneumonia in No. 3 showed no signs of septic infection. It would probably have been wiser not to have operated upon so bad a case at the age of 72. No. 31 was a great disappointment. The operation had been very extensive; the bit of mucosa saved on the left side had been used to cover the raw surfaces of the submaxillary flaps, and healing had gone on most satisfactorily, when he unexpectedly died—apparently from aortic disease.

## SUMMARY.

We now find that, eliminating case No. 1, for reasons given, we have 33 cases, about which the following general remarks may be made. There were 3 women and 30 men. The youngest patient was 42, the oldest 75. The great majority of cases (19) occurred between 50-59 years of age; 5 between 40-49; 6 between 60-69; 3 between 70-75. As to site, in

the 26 tongue cases, 6 were anterior; 12 lay in the molar region, in front of the anterior pillar; 6 occupied more or less of this region and of the anterior third; 1 stretched back into the posterior third; only 1 occupied the posterior third.

Adding together our two previous summaries we find that of 33 primary cases (26 tongue, 7 frænal):—

1 is free from cancer after 11 years;

1 is free from one cancer after 8¼ years, and from another after 2¼ years;

2 died free from cancer after 6 years and 4¼ years;

1 (frænal) is free after 2¼ years;

1 is free after 11 months.

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1 recurred in a low gland after 4¾ years;

1 recurred *in loco* (frænal) after 3¼ years;

1 recurred twice in glands during the first 2 years, and these remained free from local or cervical recurrence till death at 4¼ years;

16 others recurred within a year;

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8 died.

The main questions, under which lie several others, are:— 1. Could not recurrence have been more frequently prevented? and, 2. Could not the immediate mortality be reduced?

1. Some "recurrences" may really be fresh growths. This would seem most probable when they occupy positions separated by an interval from the first growth, not in the line between it and the nearest glands, and not parts of the original operation-wound, which might have been directly inoculated from the primary growth. The time-relation is less important: true secondary recurrences may appear very late. These "recurrences" cannot be prevented.

We have had reason to think, though it is difficult to prove, that some recurrences have been due to direct inoculation of raw surfaces from the growth as it is dragged past them, and we have endeavoured to keep the growth wrapped in a "guard." This is not satisfactory: and we propose in future to try wiping over the surface of the growth with the cautery before beginning the operation. Similar infection of surfaces undoubtedly takes place from wounded or burst, softened

secondary glands—an accident which it is not always easy to avoid, though every care to do so should be exercised (Nos. 12, 15, 19, 23). The escaped contents of such a gland should be at once wiped up, soiled instruments should be sterilized, soiled hands cleaned; probably we cannot do better than follow Cheyne's advice and paint the soiled surface with pure phenol.

But the great majority of recurrences are due, *in loco*, to the removal of an insufficiently wide margin of apparently healthy tissue round about the primary growth; or, in glands, to a too limited operation upon the gland-area in connection with that growth. More extensive operations would, doubtless, have diminished these recurrences.

Of the 19 cases which recurred, we failed in 2 (Nos. 3 and 19) to ascertain the site. We know that 8 (Nos. 4, 5, 6, 11, 18, 21, 29, and 33) recurred *in loco*. In our operations a margin of at least half an inch has been aimed at, but not always obtained even when it might have been: we have not infrequently allowed the desire to diminish the mutilation—to preserve some clearness of speech, some sense of taste, some power of voluntary deglutition—to weigh unduly against the paramount object of the operation. In particular, respect for "the middle line" has been too great. A disease so difficult to arrest as this is, certainly justifies the freest treatment. Every one holds this: the difficulty is the practical one of ascertaining the limits of the growth. Touch in the deeper parts of the tongue is not a sufficient guide, and one cannot see—indeed, one does not want to see—the growth. If the tongue and its surroundings had no more importance than, and were structurally similar to, the breast, the problem would be solved: there would be no hesitation in making a clean sweep of the whole organ. But there is a septum down the middle of it, and we know as a matter of experience that the sacrifice of one half or even less is often sufficient to prevent local recurrence: consequently, we do hesitate to remove the whole organ.

It is not until we get well back into the molar region that these difficulties are serious. We endeavour to meet them by providing better access than can be obtained through the mouth, so that touch and sight can be used more effectively.

To this end we have most commonly employed Langenbeck's section of the jaw in front of the ramus, with wide separation of the two parts. Several times a wedge of bone (Esmarch) has been excised when cicatricial closure of the jaws has seemed likely: necrosis has been very common. When the jaw has been involved the part has been removed (with or without breaking the arch), and access to the soft parts has been obtained. Kocher's submaxillary operation has not always answered our expectations—perhaps because the faucial pillars have not been divided sufficiently freely to allow the base of the tongue to come well out. But this, we understand, has now been abandoned by Kocher himself in favour of median section of chin, jaw, and tongue back to the hyoid, which he considers gives still better access. For cancers towards the back of the tongue we have not tried it; but it is certainly the most satisfactory method of dealing with frænal cancers and others involving the anterior part of the floor (Nos. 10, 33, 34). With one or other of these aids we endeavour to remove the growth in a capsule of apparently healthy tissue which is nowhere less than half an inch, and which is double this, if possible, behind and beneath the growth. Section of the muscles above the hyoid bone is the most certain way of obtaining this. There is probably most danger of recurrence in these two directions.

One other point with regard to the local operation. Although there does seem to be a marked difference between squamous and spheroidal epithelial cells in their tendency to stick in the lymphatics between the growth and the glands, this does happen occasionally with squamous epithelium. Thus a small nodule, apparently cancerous, was removed from the superior constrictor in No. *22*; and we think that in No. 13 the recurrences in the right submaxillary region were probably due to similar deposits. As the lymphatics from the anterior part of the tongue and floor are said to pass through the mylo-hyoid on their way to the submaxillary glands, a careful examination, at least, of this muscle should be made in cancer of these parts; and removal of it and the anterior belly of the digastric would be advisable in advanced cases.

With regard to the gland-operation, it has always been our teaching and practice that the nearest glands should be

removed; and, with three exceptions, this has been carried out. The exceptions were No. 2 (1892), No. 9 (aged 75, 1895)—curiously, two out of the few cases in which there was no recurrence—and No. 14 (1897). Unless this man declined to allow a gland-operation to be done, we cannot account for its omission. The result was disastrous, as reference to the table will show. We feel, then, that cases in which it may be justifiable to omit a gland-operation must be very exceptional. The question of the extent to which these operations should be carried is still a matter of opinion. The cases recorded will show that it has been steadily extended. Beginning with submaxillary incisions which ended below the angle of the jaw, the incision recommended by Kocher (1893) was adopted in 1894 (Case No. 6), and was soon used in all cases, on one or both sides. In 1896 incisions downwards along the anterior edges of the sternomastoids were added (in a frænal case) and have been used since whenever it seemed desirable to remove glands below the carotid bifurcation. As in operations on the primary growth, so in those upon glands, success has often seemed to be just missed. Thus in Nos. 7 and 11 (growth opposite molars), the operation was practically limited to the submaxillary glands and recurrence took place in the subparotid and upper deep cervical. In No. 4, the growth being anterior, deeply infiltrating, and on both sides of mid-line, clearance of the submental and submaxillary regions on both sides was followed by swelling of upper deep cervical glands on both sides; whilst in No. 13, a similar but less extensive case, removal of the submental, both submaxillary and both deep cervical glands by Kocher's incisions resulted in recurrence in deep cervical glands below the level of the hyoid. We therefore think that in early cases, whether in the anterior or middle third, the submaxillary glands and all glands beneath the sternomastoid, parotid and posterior belly of the digastric down to the bifurcation of the carotid and backwards as far as can be reached along the 11th nerve, should be removed, together with as much connective tissue as can be taken with them. If the history shows that an epithelioma has existed for more than two months, especially in the middle and posterior third, it will be wise to add an incision along the anterior edge of the sternomastoid to the clavicle and to

remove the deep cervical glands as far as can be done without dividing muscles. There is a deep cervical gland behind the jugular vein about the level of the cricoid which seems liable to infection even before those higher up. We find a special note of it in No. 12 (growth opposite tonsil; 3 months pain), No. 19 (middle third, 2 years spreading leucoplakia, 2 months ulcer and pain), and No. 27 (growth in anterior and middle thirds, 18 months sore).

If the mid-line of tongue or floor is crossed by a growth, a gland-operation should be done upon both sides (Nos. 4, 13, 16). So also in most, if not all, cancers of the posterior third.

If a gland is adherent to muscle, a good piece of muscle should be removed with it: it is wholly unsafe to dissect the gland off. Similarly, where a gland is closely adherent to a vein (*e.g.*, jugular) a sufficient length of the vein should be removed. It is sometimes possible to separate the gland, leaving the vein apparently quite clean: it is almost certainly epitheliomatous (*see* No. 13). When, as is much more rarely the case, the carotids are similarly involved, either a piece must be cut out (No. 7)—a course by no means free from dangers—or complete removal must be given up (No. 25). In no case was the vagus involved.

The remarks as to the proper extent of the gland-operation are still only tentative. It would be a great help to have a "set" gland-operation as we have in the case of the breast, capable of extension under special circumstances. But the lymph-streams from the tongue evidently pursue a much less regular course than do those from the breast, *i.e.*, an operation calculated for the average tongue-case will cover a far smaller number of cases. Nevertheless we feel confident that there would have been fewer recurrences in glands had the above suggestions been followed.

2. As to the heavy mortality, we have already said (p. 643), whilst the cases were fresh in mind, what we feel we may in explanation of it.

With regard to its diminution, care in selecting suitable cases is the first requisite. On first reading over the cases, we felt that perhaps we ought to have refused to operate upon Nos. 30 and 32; but that was chiefly because they died.

We should not decline to operate upon a man with a bad cancer because he was 72, or because he had aortic disease. No. 17 ought certainly not to have been operated upon.

Having selected a suitable case, the following is the general plan of treatment. The teeth are scaled, and cavities and stumps are seen to (Cheyne). Much time is spent in washing out the mouth with boric lotion. The chief and, we think, best anæsthetic throughout is chloroform; but sometimes ether is given during the gland-operation. A little (¼ gr.) morphia, 15 minutes before starting, has several times acted well. The mouth is cleansed and the surface of the growth cauterised. The gland-operation is first carried out and the wound is closed, if it is certain that the tongue-wound will not open into it: if there is any doubt about this, it is left open. In either case it is "guarded." Then the growth in the mouth is removed. The head is generally turned towards the same side as the disease; but sometimes, especially when the jaw is sawn, towards the opposite side. In either case, the dependent side of the nasopharynx and cheek are arranged so as to form a "well" for blood below the level of the glottis: with this position it is rare to hear the slightest rattle. A head-light or hand search-light is used. Tracheotomy is performed only for dyspnœa. If the jaw is to be divided anywhere the lip and chin are always divided in the mid-line, and the cheek and Kocher's submaxillary flap are raised to the proper extent. The paralysis of the lower lip which resulted from Langenbeck's cut down from the angle of the mouth is thus avoided. After the removal of the growth, every endeavour is made to cover over the raw surface in the mouth with mucous membrane, and to leave a mobile tip to any tongue that remains. Extensive early healing may thus often be brought about; and discharge into the mouth is proportionately diminished. If the wounds in the mouth and neck communicate or even come close to one another, the latter is freely drained with a gauze plug. The mouth-wound is painted with Whitehead's varnish. Until the patient has recovered consciousness and any shock has passed off, he is kept lying on the sound side, with the angle of the mouth low, and is well looked after by a nurse. After a few hours he is set upright against a bed-rest, and remains in this position; fluids

tend to run out of the mouth, the patient is more easily assisted to get rid of mucus; he breathes, spits, and coughs more effectively. His mouth is frequently cleaned with "dabs" moistened with soda-solution. Twice a day mouth, teeth, and tongue are carefully gone over, and after one of these cleanings Whitehead's varnish is applied to the dried surface. The patient rinses his mouth frequently, and always before and after food. He is fed at first by the rectum, and, if necessary, by stomach-tube; these means of feeding are abandoned as he becomes able to swallow. Little or no stimulant is required.

The shock resulting from prolonged operations upon the neck and tongue is surprisingly slight, although a good deal of blood is sometimes lost. Consequently the cases detailed have, with one or two exceptions, had both growth and glands removed at one operation, and we feel that with average patients more may be done than has been done. It may be that the deaths from hypostatic pneumonia and exhaustion—possibly even some others—would have been avoided by operation *à deux temps*; it is not to be wholly put aside. The advantage to the patient of one operation instead of two is obvious; but there seems to be another which is not so clear. The effect of removing the mouth-growth and waiting for 1 to 3 weeks is to send a greatly increased lymph-flow through the infected glands and to give them time to profit by it. Surely, this must diffuse their contained epithelium more widely. It will be noted that when the operation in two stages has been adopted, the opposite course has been followed—the gland-operation has been done first and the lingual secured. This has the effect, it is true, of turning the lymph-stream along some abnormal path; but it is diminished, not increased. Further, if after a week the removal of the tongue leads to a communication with the neck, healing is advanced and trouble much less probable than under the opposite circumstances, viz., an old oral and a recent cervical wound.

# THE DIAGNOSIS OF EPITHELIOMA OF THE MOUTH FROM TERTIARY SYPHILITIC AND OTHER LESIONS.

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[With Plates LII.–LIX.]

Few problems in surgery are of more frequent occurrence than that of the diagnosis between epithelioma and syphilis of the tongue, and certainly none are of more vital importance. I venture to think that no surgeon of much experience has escaped error in diagnosis in this matter. Unfortunately the mistake of treating a syphilitic ulcer or induration of the tongue for an epithelioma, a venial one, is rare; that of pronouncing a cancerous ulcer or growth to be a gumma, the gravest of mistakes, is comparatively common. The difficulties met with will be understood from the following considerations:—

1. From at least 30 per cent. of patients with epithelioma of the tongue a history of former syphilis can be obtained.

2. In perhaps 20 per cent. epithelioma supervenes on tongues that have been the site of chronic syphilitic inflammation; superficial glossitis may be actually present when epithelioma develops (*see* Fig. 1). Thus syphilis of the mouth predisposes to, and often passes directly into, cancer.

3. Whilst in the majority of cases an accurate diagnosis can be made of any individual ulcer or lump on the tongue, lips, &c., in a certain number it is quite impossible to tell until microscopic examination of sections has been completed.

4. The "therapeutic test" is often fallacious; that is to say, when iodides are given for epithelioma of the tongue it is quite common for the condition to appear to improve, especially as the hygiene of the mouth will probably be attended to at the same time and alcoholic stimulants left off. The patient may also lose his pain under iodides for some little time, just as he will under the X-rays.

PLATE LII.

Fig 1. *The entire tongue excised on account of a horse-shoe epitheliomatous ulcer of the posterior third. The whole dorsal surface is scarred and puckered by chronic glossitis, which had lasted many years. The patient was a heavy smoker, who had had syphilis.*

## PLATE LIII.

Fig. 2. *Epithelioma of the Papillomatous or Warty type, projecting from the dorsal surface of the tongue in its anterior third. There was no ulcer, but the rest of the tongue was scarred from old chronic superficial glossitis. Recurrence followed excision of the growth.*

## PLATE LIV.

Fig. 3. *Epithelioma of the Tongue of the Nodular Form. There was only a central depression, no true ulcer, but the nodular elevations were formed of large masses of epithelioma growing down into the substance of the tongue-muscles.*

PLATE LV.

Fig. 4. *Gummatous Ulcer of Dorsum of Tongue. The ulceration was of unusual extent, and penetrated deeply into the substance of the tongue. A white slough formed the floor of the ulcer.*

5. Epithelial cancer of the mouth has no uniform characters, its origin and progress vary greatly. In nineteen cases out of twenty it presents itself as "a growth;" there is a raised hard edge to it, often a papillomatous projection. Yet now and then, as in a case reported by Mr. W. G. Spencer at the Medical Society, so far from there being any growth, the affected tongue slowly and steadily shrinks, just as the breast does in atrophic cancer.

The common forms of epithelial cancer of the tongue and lips are the hard-edged ulcer (*see* Fig. 1), the warty or papillomatous projection (Fig. 2), the indurated plaque, and the bossy or nodular induration (Fig. 3). In all the three last forms cancer may exist for some time, and infect lymphatic glands, before any ulceration occurs. The time-honoured distinction "cancer of the tongue is an ulcer which indurates, whilst tertiary syphilis causes an induration which ulcerates" is even less true than the majority of such axioms in surgery.

It has already been noted that no single symptom or physical feature can be relied upon for a diagnosis of cancer when it occurs in the mouth. What are the most distinctive signs of it compared with those of tertiary syphilitic lesions? First, the *site*, gummatous ulcers being frequent on the palate, the back of the pharynx, and the dorsum of the tongue (Fig. 4). They are rare on the free border of the lips, the sides of the tongue, and the floor of the mouth. The three last positions are common sites for epithelial cancer.

If an ulcer exists, the *induration and projection of its edge* is greatest in cancer. The "wash-leather slough" of a breaking-down gumma is very characteristic, but I have seen it simulated perfectly in a septic cancerous ulcer. Shooting *pain*, especially that referred to the ear through the gustatory to the auriculo-temporal nerve, is a symptom of the gravest suspicion in a case of doubtful ulcer of the tongue. The *examination of a scraping* from the floor of an ulcer (a test introduced by Mr. Butlin) is of undoubted value, but it must be done with care. The floor of the ulcer must first be thoroughly cleansed of all extraneous matter or discharge; the scraping then made should be stained with methyl violet or blue, and examined with a medium power in glycerine or distilled water. If the ulcer be syphilitic, tuber-

cular, or "dental," the scraping will show but little epithelium, and that of the ordinary squamous type with small nuclei. If the ulcer be cancerous, modified epithelium of rounded or oval form, with large, often multiple, nuclei, will be freely present: occasionally cell-nests can be detected. In many cases I have found Mr. Butlin's test of assistance. It depends on the fact that in cancer there is active proliferation of the epithelium, and that the floor of a cancerous ulcer is entirely composed of such epithelial cells.

It is hardly necessary to say that the *age* of the patient does not afford the slightest help in diagnosis. Apart from the fact that cancer and tertiary syphilis are both common in late adult life, it is well known that epithelial cancer may develop before the age of 30. Kirmisson performed colotomy for rectal cancer in a girl aged 21 years, and Garrard records a fatal case in a boy aged 12. I have operated for rodent cancer of the face on two men in whom the disease commenced at 14 and 25 years respectively. With regard to epithelioma of the tongue I happen to have observed a most striking example of early development. A girl, aged 19 years, came with a suspicious hard nodule on the lingual margin. I excised it, and sections under the microscope revealed epithelial cancer. This was confirmed by a recurrence *in situ*, and the second time a free excision was performed. Again the diagnosis was proved by the microscope. When the patient was seen two years later she was free from further recurrence. Her sex and age make the case probably unique.

In another case under my observation a young clerk, aged 24, died from recurrence in lymphatic glands following excision of an epithelioma of the tongue.

If age is no criterion, many of the other signs of lingual cancer of equally little value, such for example as fixity of the tongue in the mouth, dysphagia, salivation, foul discharge, and extreme fœtor, masses of hard glands in the neck, &c. The merest tyro can diagnose cancer when such late symptoms are present, but of what use can be such a diagnosis? None of these symptoms are present in the early stage, and it is then only that a correct diagnosis may be the means of saving the patient's life. Here again, the text-book account with its table of symptoms has exercised a most pernicious effect.

*The condition of the Cervical Lymphatic Glands.* — The subject of glandular enlargement deserves more detailed notice. With regard to cancer in the mouth this is all-important in the matter of treatment; in diagnosis it is liable to be much over-rated. In fact, when the surgeon is confronted with a case of suspicious ulcer or growth on tongue or lip, he should endeavour to decide its nature irrespective of whether there are enlarged glands or not. Far too much has been made in the text-books of diagnosing epithelioma of the mouth by the presence of hard swollen glands in the neck. To expect these enlarged glands in every case of cancer of the mouth, when it first comes under care, is folly; to delay operative treatment until they can easily be felt is a crime. The following considerations will prove the truth of this :—

1. Cases of lingual and buccal cancer which are really hopeful as regards permanent cure from operation are those in which free excision is resorted to before any secondary deposits have formed in the neck. It is true that some remarkable successes have been obtained after removal of cancerous glands in this position, but they form a very small minority compared with the general run of failures.

2. It is impossible for the surgeon to detect the earliest infection of the lymphatic glands by palpation, and therefore it is useless for him to say "the glands are quite free, we can afford to wait." The glands concerned are always those beneath the deep cervical fascia; they are generally overlapped by the sterno-mastoid muscle; they lie along the great vessels whose pulsation much impedes their detection. In a patient with "a full neck," *i.e.*, with a considerable amount of fat above the deep fascia, it may be difficult to make out even glands that are much enlarged. In clearing out the group of glands along the jugular vein in cases of lingual cancer I have often found yellow epitheliomatous nodules in one or other of these glands—nodules varying in size from a millimetre upwards; yet before the operation many observers had failed to detect these glands at all. In the analogous case of scirrhus of the breast this has become a truism. No surgeon will say before operation that the axillary glands are free from secondary deposits, for he knows how often dissection would prove him to be wrong.

The earliest glandular deposits of cancer in the axilla or the neck cannot possibly be recognised before operation. This is a simple statement; its truth will be obvious to everyone who reflects for a moment on the subject; yet how many lives are still sacrificed every year through its neglect? The text-book teaching to diagnose cancer of the breast or tongue from palpable enlargement of glands in the armpit or the neck has already done more than enough harm; its further survival is to be deplored.

In treating cancer of the tongue a careful and thorough attempt to clear away all the glands in which secondary deposits may be expected to have formed should be made, quite irrespective of whether such glands have been felt beforehand or not. The time at which the first operation is done is the surgeon's opportunity: if he delays to deal with the glands until they are easily palpated, the patient's chance is practically gone.

3. Septic, syphilitic, or tubercular ulcers of the mouth frequently cause glandular enlargement in the neck; hence in the differential diagnosis of cancer reliance on this symptom must be entirely fallacious. I have seen several cases of tertiary ulceration of the tongue in which the cervical glands have been considerably swollen for a time and have wholly subsided under treatment with iodides.

*Leucoplakia Linguæ and Epithelioma.*—The condition of keratosis producing a dense white coating on the tongue is well known, and the frequency with which it passes into epithelioma thoroughly recognised. In Fig. 5 this is illustrated. There is no direct relation between syphilis and leucoplakia; some of the most marked instances of the latter are met with in men who have never had syphilis. Persistent smoking alone, aided by spirit-drinking, will produce the condition on the tongue or inner sides of the cheeks, occasionally on the palate.

We may distinguish between the thin white patches and scars often left by chronic superficial glossitis and true leucoplakia. In the latter the patches are of a dense white colour, with sharply-defined outlines. Sometimes fissures are present amongst the white areas, but there is less tendency to ulcerate than in the chronic syphilitic tongues. But the risk of epithe-

## Plate LVI.

Fig. 5. *Epithelioma of Tongue supervening on Leucoplakia. Almost the entire surface of the tongue had been covered with dense white patches for a long time. The epithelioma took the form of a hard oval protruding lump.*

PLATE LVII.

Fig. 6. *Leucoplakia of the Tongue. The defined outline of the thick white patches is well shown. The condition is one almost certain to end in epithelioma.*

## Plate LVIII.

Fig. 7. *Firm white papillary growths on the posterior third of the tongue. They are met with in a few cases of secondary syphilis, and as a rule entirely disappear under mercurial treatment.*

## Plate LIX.

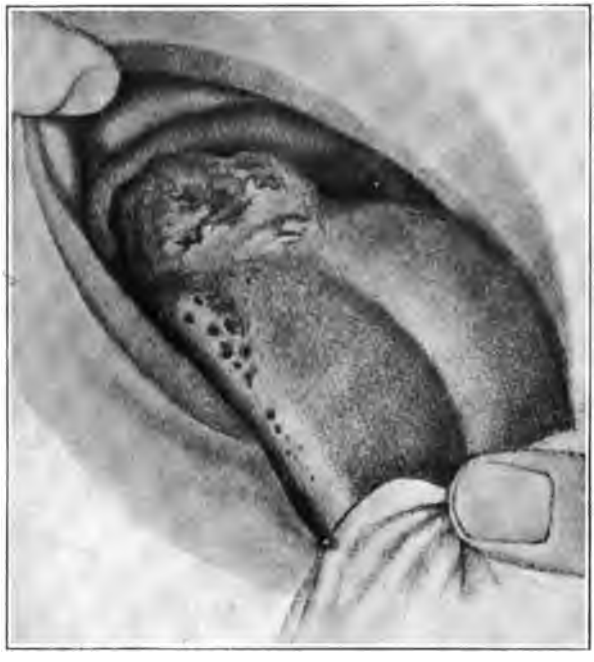

Fig. 8. *Projecting Gumma of the Tongue, near the Epiglottis. The patient was aged* 76*; he contracted syphilis at the age of* 56*. The gumma had existed for four months, and had been diagnosed as cancer. Under iodides and mercurial inunction the lump entirely disappeared. (From a case under Prof. von Esmarch of Kiel.)*

lioma, usually of the warty or projecting form, is very great in cases of true leucoplakia. Years may elapse, but sooner or later, as Mr. Henry Morris and Mr. Hulke have proved, cancer will almost certainly supervene. The earliest occurrence of the epitheliomatous change is not easy to detect, but it may be laid down that directly localised induration, and still more papillomatous growth, is recognised, surgical intervention is called for. In fact, since no medicine or local application can be relied on to cure leucoplakia of the tongue, it is wise to operate in the pre-cancerous stage and so remove a source of grave danger to the patient. It is unfortunate that leucoplakia is commonly so extensive that its total excision will not be consented to by the patient.

The difficulty in diagnosis alluded to was well illustrated by the following case:—An officer of middle age, an inveterate smoker, presented extensive leucoplakia of the tongue, in one spot of which there was a small hard ulcer. My father operated, excising the diseased mucous membrane freely. Independent microscopic examination returned the verdict "not cancer;" but a few months later glands enlarged in the neck which were proved by further operation to contain epitheliomatous deposits. The patient remained well for many years afterwards—was, perhaps, permanently cured.

Whenever the opportunity presents of excising part of the tongue for epithelioma supervening on leucoplakia, the white patches should be freely removed with scissors at the same time as the part affected with the cancer.

At the commissures of the lips triangular white and thickened areas of keratosis are often seen in smokers. They are not often so thick, nor do they resemble layers of white paint so closely, as when met with on the tongue. The danger of epithelioma supervening is not so great in these "smoker's patches," but still it exists, and when it occurs it is as deadly a form as any, operation being nearly always followed by return of the disease.

"*Dental Ulcer*" *and Epithelioma.*—A chronic hard-edged ulcer of the tongue opposite a sharp or carious tooth must always be regarded with suspicion. If the removal of the exciting cause be not followed by healing of the ulcer, it is

usually best to treat the latter as a commencing epithelioma and to excise it freely.

Here, as in the case of persistent hard ulcers of the lips, the microscope may fail to confirm the diagnosis of cancer, but the patient is rid of a grave risk at the expense of a small operation. Mistakes in diagnosis are far more frequent in the direction of overlooking cancer of the mouth than in urging operation for an innocent lesion. The microscope moreover is not infallible, and the earliest or "pre-cancerous" stage can hardly be certified by its aid. It is by prompt excision of suspicious ulcers or papillomatous growths, whether of the tongue or lips, that a hope is held out of diminishing the terrible mortality from true cancer of these regions.

# TRANSHYOID PHARYNGOTOMY.

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Epithelioma of the anterior portion of the tongue can be dealt with by certain well-known operative methods, and such treatment follows along certain fairly well-traversed lines. Malignant disease of the tonsil or pharynx has also called forth a certain amount of operative activity during the past twenty years, and it is neither a difficult nor an unusual thing to open the pharynx from the side by an incision along the anterior margin of the sterno-mastoid, so as to expose and remove such a growth. When, however, a tumour forms at the base of the tongue encroaching on the epiglottis and yet not invading the larynx, there is but little information to guide the surgeon as to efficient treatment. Of course it is possible to remove the whole tongue together with the epiglottis by means of Kocher's operation; but this is a terrible mutilation, and, should the anterior portion of the organ be free from invasion, an unnecessary procedure, granting that the diseased area can be effectively removed without touching it. The facts that in Mr. Butlin's admirable work on "Diseases of the Tongue (1900)" there is no mention of any plan of reaching this region with a view to extirpation of an epitheliomatous growth, and that in the last edition of Mr. Jacobson's "Operative Surgery (1902)" there is a similar hiatus, indicate that the plan of attacking this part of the organ referred to below is not generally known.

One must of course acknowledge that epithelioma limited to the root of the tongue is by no means a common affection. Thus Butlin classified the position in eighty cases which he had collected, and found only one involving the root alone. On the other hand, the fact that quite a number of cases have been sent on to me from my colleagues in the Throat Department during the last few years suggests that they are not really so rare as statistics of operating surgeons would

indicate, and that they have either been overlooked or allowed to remain untreated. Certain it is that the majority of the cases were inoperable when I saw them, or the patients would not accept the risk; but it may be hoped that if the existence of malignant disease in this region is recognised more generally as a possibility, then the cases may be sent on to surgeons at an earlier date, and that thus more frequent opportunities of utilising this operation may be found.

The physical characters of a cancer in this region are very similar to those of growths in other parts of the tongue, but there is perhaps a little more tendency to proliferative outgrowth, and a very typical crateriform ulceration may ensue. The patient complains of some amount of pain in swallowing, but the movements of the tongue are not so much impaired as when the base of the organ and floor of the mouth are involved. There is much salivation, and after a time the voice becomes hoarse from an associated laryngitis. The submaxillary lymphatic glands are before long invaded, but the submental may escape; later, the glands along the main vessels of the neck are attacked in the usual way. The local disease spreads to the epiglottis, and thence may pass downwards to the larynx; or it may travel forwards and invade the rest of the tongue. It is obvious that, if an attempt is to be made to save the anterior portion of the organ, the pharynx itself must be opened, and the disease attacked from behind. Three plans of pharyngotomy have been suggested, viz., lateral, subhyoid and transhyoid.

*Lateral pharyngotomy* is practically identical with Cheever's plan of opening the pharynx with a view to removing growths of the tonsil. Its advantage is that the glands can be dealt with at the same sitting, but it gives a bad approach to the back of the tongue, and is not without its disadvantages as regards interference with important structures in the neck.

*Subhyoid pharyngotomy*, or Malgaigne's operation, consists in dividing the thyro-hyoid membrane through a transverse incision, and opening up that space. It is clear that only a transverse chink is obtained in that way, the epiglottis being either divided near its base or separated from the tongue, and pulled downwards and outwards. The entrance to the larynx may be seen fairly well by this means, but the exposure of

the back of the tongue is not very satisfactory. The operation has been but little performed of recent years, and one might almost say that it has fallen into disuse.

*Transhyoid pharyngotomy* consists in making a vertical incision beneath the chin, and dividing through it the hyoid bone in the middle line, so that the two halves may be pulled aside, and then the pharynx opened either through the base of the epiglottis or by detaching it from the back of the tongue. In this way one can either expose the lower part of the pharynx, including its posterior wall and the orifice of the larynx, or lay bare the posterior surface of the tongue. An excellent account of this procedure is given in the *Revue de Chirurgie*, by Vallas (May 1900), and it was from that article that I obtained the needed suggestion as to the treatment of the case which I shall narrate anon. At present my experience of this operation is but small, being limited to three cases. One was undertaken by my colleague, Professor Rose, and consisted in the exposure and partial removal of a rapidly-growing sarcoma of the posterior wall of the pharynx. In a second case I removed the back of the tongue, but had also to take away half the larynx, and this added a complication which unfortunately led to a fatal termination. My original case, however, which I relate *in extenso* below, was a pure epithelioma of the root of the tongue, involving the epiglottis, but not encroaching on other parts; and although glands had to be removed from over the main vessels of the neck, yet the patient remained well and free from recurrence for nearly two years and was able to enjoy his existence. That such a result should have been obtained is most satisfactory, and I relate it in the hope that it may stimulate others to attempt a similar procedure.

W. S., aged 60 years, was admitted to King's College Hospital on September 1st, 1900. He stated that in January, 1900, he first noticed a lump on the dorsum of the tongue towards its posterior aspect; it had steadily increased in size, but caused very little inconvenience. He was sent to me by Dr. St.Clair Thomson, from the Throat Hospital, Golden Square. On examination he appeared a healthy man, and did not look older than he stated. He was able to protrude the tongue fully, but complained of some discomfort on swallowing,

though not very much. Nothing was to be seen from the front beyond the fact that the tongue was slightly fissured, as is common in smokers. On looking at the posterior aspect of the organ with a laryngoscope, I found a large indurated ulcer, with raised edges, extending to the epiglottis which was invaded, so that the growth was visible on its posterior aspect nearly to its base. It reached forwards for about an inch and a half from the epiglottis, and was more on the left side than on the right. Beneath the left angle of the lower jaw there was an enlarged gland.

On September 4th, removal was undertaken by means of a transhyoid pharyngotomy. A preliminary high tracheotomy was first performed, the thyroid isthmus being divided. The trachea was placed deeply and the rings were calcareous. A Hahn's tube was inserted, and through this chloroform was administered, a sponge being kept over the entrance of the larynx during the remainder of the operation.

A vertical incision was made reaching from the symphysis menti to the top of the thyroid cartilage, and a second at right angles to this along the hyoid bone. This second incision was needless, and indeed one would have done better without it. The vertical incision was deepened through the platysma, and the genio-hyoid muscles were separated, so as to expose the anterior surface of the hyoid bone. This was cleared by a raspatory sufficiently to enable a pair of bone-pliers to be applied, and by this means it was divided in the middle line. The two segments were drawn apart by retractors, and with a little under-cutting a considerable interval was obtained, in which was exposed the middle thyro-hyoid ligament, and beneath it a pad of fat. Through these structures an opening was made with the knife just above the thyroid cartilage, and the base of the epiglottis was cut through, a little above the superior false vocal cords. This opening was enlarged by scissors on either side by dividing the ligament and portions of the thyro-hyoid muscles, so as to enable the finger to be inserted, and thus the exact size and situation of the growth on the back of the tongue was readily defined. It was then merely a question of snipping with the scissors to take away the growth. Incisions were made in either side of the epiglottis well away from the lateral margins, and thereby the

segments of the hyoid bone were more easily separated, giving additional space to work in; next I removed a V-shaped segment from the back of the tongue including the whole of the diseased tissues, and this without encroaching on the main vessels or nerves, although the left hypoglossal nerve was seen. The bleeding was very slight, and readily controlled by ligatures. I drew the edges of the V-wound together at the anterior extremity, but behind it was too extensive for this to be undertaken. Three catgut stitches were employed in this way. The two halves of the hyoid bone were stitched together by a catgut suture passed through its periosteum. The central part of the wound was left open and a gauze plug introduced, the rest being closed by sutures. The glands were left for a subsequent operation. Finally, the large tracheotomy-tube was removed, and a smaller Hahn's cannula introduced.

Very little shock was experienced from the operation, which lasted just over an hour. The after-history of the wound was uneventful. The Hahn's tube was replaced by a Parker's tracheotomy-tube after forty-eight hours, and four days later, as the latter seemed to make the patient cough, a Durham's tube was substituted. The gauze stuffing was early coughed out, and as it could not be retained with comfort, it was not replaced. The mouth was frequently washed out with boracic lotion, and at no time was there any marked fœtor of the breath. Rectal feeding was alone employed for the first five days, and afterwards he was fed through an œsophageal tube. The tracheotomy-tube was omitted on the tenth day, and two days later he could talk clearly. There was a little suppuration from the wound, but healing was complete in three weeks. The temperature never rose above 100, and his pulse was never above 90 per minute. The notes state that, when his wound was healed, he was able to swallow liquids, but with a little difficulty; he managed it best when sitting up.

On October 11 the glands in the neck were removed through an incision along the anterior border of the sterno-mastoid. They were closely adherent to the sheath of the great vessels, and extended well below the thyroid cartilage. The operation presented no special features, and the wound healed rapidly and completely. He left the hospital on October *22*, quite well, but with some slight difficulty in

swallowing. He could protrude the tongue quite straight, and talk naturally. When examined in July 1901 he was well, and without any sign of recurrence either in the mouth or in the glands. The movements of the tongue were normal, but he complained of the saliva dribbling from his mouth. He had but slight difficulty in swallowing; if hurried, however, some would "go the wrong way." His speech was thick as a result of chronic laryngitis, evidently due to the occasional irritation of the larynx by the passage of food.

He was shown at a meeting of the Medical Society in 1902, and was then (eighteen months after operation), free from recurrence. The condition as seen by the laryngoscope was extremely interesting, inasmuch as two well-marked folds had formed, reaching from the base of the tongue down on either side to the back of the larynx, constituting two "arytæno-lingual" folds. These sufficed in large measure to protect the orifice of the larynx from the entrance of food. In the early part of this year (1903) he showed himself at the hospital, and there was a decided enlargement of the glands in the right side of the neck, and for these he was to have been admitted, but he has not again presented himself.

In conclusion, one cannot but emphasise the commendations given to this method of operating by Vallas (*op. cit.*). The osteotomy of the hyoid bone is in itself a simple and harmless procedure, and gives an excellent approach to the back of the tongue, to the pharynx, and to the laryngeal orifice. If the trouble to be dealt with is in the larynx or posterior pharyngeal wall, one should divide the epiglottis low down, close to its thyroid attachments. If, however, the mischief is limited to the back of the tongue, as in the case of benign tumours in that region, when the epiglottis itself will not need removal, it would be better to dissect back that structure from the tongue, and open the buccal cavity in front of it.

# THE INSIDIOUSNESS OF CANCER OF THE MOUTH.

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If it were the nature of cancer to announce its presence and exact locality by early and unmistakable signs, it would not be the terrible disease that it is, and the efforts of the surgeon would be uniformly successful. But this is unfortunately not the case. The early stages of a malignant growth produce so few symptoms that the disease too often passes unrecognised until it has assumed such dimensions, or has extended and involved adjacent parts to such an extent, that operative treatment is either entirely out of the question or can only be undertaken with a poor prospect of success.

It is no wonder that this should be so with cancer of internal organs or of deeply-seated parts, but it seems at first sight incomprehensible that cancer of the mouth can grow to any great extent without being noticed. The mucous membrane of the mouth is peculiarly sensitive, so that any small foreign body causes marked discomfort; the tongue is frequently inspected both by its owner and by the medical attendant, and the dentist spends most of his time looking into the mouth. Yet it is astonishing how often patients, doctors, and dentists overlook the early stages of malignant disease of the mouth. The consequences are so disastrous that it is of great interest and importance to enquire why early cancer is so often missed—why the disease is so insidious.

In many cases it is because it causes such slight inconvenience that the patient does not think it worth while to consult a medical man. This is particularly so with the working classes, who naturally prefer to put up with slight inconvenience rather than incur the expense or loss of time necessary to get medical advice. The following case is an example of this:—

*Case I.*—Some years ago a man came to my out-patient room on account of inability to open the mouth sufficiently to

eat with comfort. He had no pain and no other complaint. I noticed a small lump at the angle of the jaw; on examination this proved to be a cancerous gland. By retracting the cheek I could get an imperfect glimpse of an ulcer behind the last molar tooth. This turned out subsequently to be an extensive epithelioma involving the pterygo-maxillary ligament. He was operated on and died of hæmorrhage.

It often happens that patients notice secondary cancerous glands in the neck before they complain of the primary disease in the mouth.

*Case II.*—Recently I saw a man of 50 who came to me complaining of lumps in the neck which he had noticed for three or four months. They were obviously cancerous, and on looking into the mouth I saw an extensive epithelioma of the side of the tongue and floor of the mouth. On enquiry he told me that the trouble in the mouth was of only a few weeks' duration, and had given him no pain and very little inconvenience. The case was far beyond the reach of operative interference.

There are some patients who defer obtaining advice about trouble in the mouth because they are afraid they will be told they are suffering from cancer; but these are not many. In my experience more people seek advice for trivial or even imaginary ailments of the mouth and throat because they dread the occurrence of cancer.

Although the early recognition of cancer is often prevented by the ignorance or carelessness of the patient, it must be sorrowfully confessed that the doctor is often equally to blame. There are still some members of our profession who refuse to recognise the malignant nature of a case until there is well-marked cancerous cachexia. It cannot be too strongly insisted on that patients with early cancer are often in robust health, and that cancerous cachexia does not supervene in the great majority of cases until the disease has gone far beyond the possibility of operative treatment.

Another class of offender who helps to keep up the high rate of cancer-mortality is the doctor with an undue belief in the efficacy of drugs. He will ask you to see a case of extensive cancer, and will tell you that for some months he has feared that the disease was malignant; that he has given

such-and-such remedies; that the patient has improved in health; that the ulcer has assumed a more healthy appearance, &c., and that now he thinks the time for surgical interference has come. Unfortunately, the time for successful surgical intervention has usually long since gone by.

A most pernicious practice (still adopted by many good surgeons) is the administration of iodide of potassium in cases of ulceration in the mouth with the idea of clearing up the diagnosis between cancer and syphilis. In my opinion this practice is only permissible in cases which, if malignant, are clearly beyond operation. In no operable case should valuable time be wasted in giving iodide. If there is any doubt as to the diagnosis a small piece of the edge of the ulcer should be removed and examined microscopically.

Imperfect knowledge of the so-called pre-cancerous conditions of the tongue is responsible for the failure of many operations and the loss of many lives from cancer. There are certain conditions (easily recognised if suspected and looked for) which, though not cancer, will almost certainly become so if left untreated, or if irritated by useless and unsuitable applications. Thick rough patches of leucoplakia, and warts, especially if situated on a tongue already the seat of chronic superficial glossitis, should be excised without delay. Chronic ulcers on the side of the tongue, due to the rubbing of a tooth, should be cut out if they do not quickly heal after removing the cause, and more especially if they present the least degree of induration. It is a good rule to regard a chronic indurated ulcer in the mouth of a middle-aged or old person as cancerous or extremely likely to become so.

The practitioner of dentistry cannot be too conscious of the power he possesses of preventing death from cancer, and of the awful responsibility he incurs by overlooking pre-cancerous conditions or early malignant disease of the mouth. The dentist spends his life looking into people's mouths, and must of necessity often see conditions which he knows (or should know) will inevitably cause death if neglected. Although there is no occasion for him to scare his patients by telling them they have cancer, it is clearly his duty to point out to them the importance of seeking proper treatment without delay.

*Case III.*—Not long ago I saw an old gentleman who had quite recently had some teeth extracted by a dentist as a preliminary measure to fitting him up with an artificial set. He came to me because the sockets did not heal up, and he was impatient for his new teeth. He had a typical and very extensive epithelioma of the lower alveolus and a large mass of glands under the jaw. I removed the disease as thoroughly as I could, but recurrence took place a few months later. At the time that the teeth were extracted the nature of the disease must have been obvious to anyone possessing any knowledge of surgery. I should add that I believe the operator in this case was an unqualified, but registered, dentist.

It must not be supposed, however, that failure to make an early diagnosis is always the result of ignorance or neglect, for there are many cases in which the disease assumes unusual or misleading features, so as to deceive even the alert and well-informed practitioner. Suppuration is a cloak under which cancer may hide itself for a time, perhaps long enough to make the difference between success and failure when the time for operation comes.

*Case IV.*—Eliza B., ætat. 40, first noticed a slight swelling of the left cheek six weeks before admission to hospital. She then presented marked asymmetry of the face, the left cheek being much swollen, red, shining, and œdematous. The lower eyelid was swollen, and the conjunctiva chemotic. An abscess was pointing below the malar bone. An anæsthetic was administered, and the abscess opened; much blood and pus escaped. On opening the mouth an extensive epithelioma was found in the sulcus between the upper alveolus and the cheek. It was too advanced for operation A small piece was removed for microscopic examination. There was no glandular enlargement.

Inflammatory conditions of the gum due to carious teeth may hide a malignant tumour of the jaw.

*Case V.*—Albert E., ætat. 39, suffered from pain in his front upper teeth and swelling of the gum in March, 1902. Some teeth were then extracted, but without much relief. He came under my care on May 3. There was then much swelling of the upper alveolus in the incisor region, and pus exuded from the empty sockets. The swelling extended backwards for about

an inch on to the hard palate. There was an enlarged gland at the angle of the jaw on each side. Being in doubt as to whether the disease was malignant or inflammatory, I made an examination under an anæsthetic. I then formed the opinion that the disease was epithelioma, and in this view my colleagues who saw the case concurred. I excised a small piece of the disease for microscopic examination, and in a few days was informed by the pathologist that the disease was sarcoma. I therefore removed the right maxilla and a considerable portion of the palatal process of the left maxilla, and apparently got the disease well away. Ten days later I removed the glands in the neck. These were proved by microscopic examination to be sarcomatous. Two months later the patient returned with a glandular mass, the size of a small orange, on each side of the neck, and a secondary growth in the head of the left humerus. He died a few weeks later.

Malignant disease of the mouth, though not inflamed, may closely resemble an inflammatory affection.

*Case VI.*—Edward F., ætat. 44, complained of pain and swelling in the left side of the face in August, 1902. In October a dentist extracted a left upper bicuspid and opened the antrum through its socket, but no pus escaped. The swelling was thought to be inflammatory and was incised from within the mouth, but only blood flowed from the incision, although a probe seemed to enter a definite cavity. In December an exploratory operation showed that the disease was epithelioma of the antrum extending to the face and to the pharynx. Complete removal was impossible.

Malignant disease of the antrum may in its earlier stages resemble other diseases. Thus I have twice seen cases, diagnosed and treated as nasal polypi, turn out to be sarcoma of the antrum, in which the growth had fungated into the nasal cavity. In each instance the disease had become inoperable before the correct diagnosis was made.

*Case VII.*—An ophthalmic surgeon in operating on a lachrymal abscess found that the subjacent bone was eroded, and the disease communicated with the antrum. He transferred the case to my care, and an exploratory operation showed that the antrum was the seat of extensive malignant disease.

*Case VIII.*—A girl of eight years complained of a swelling in the right cheek of two months' duration. A finger introduced into the mouth detected a soft swelling in the region of the canine fossa: the bone was bulged and to a great extent absorbed. I diagnosed the case as one of cystic swelling of the antrum, and felt confident that the disease would turn out to be a dentigerous cyst. In this opinion my colleagues fully concurred. On exploring the swelling I found to my great surprise that the antrum was full of a soft reddish growth. I scraped it out and sent the pieces to the pathologist, who reported that the growth was an ossifying sarcoma. I removed the upper jaw, and she made a good recovery.

*Case IX.*—An old man complained for several months of severe and increasing lancinating pain in the left side of the face. As nothing abnormal could be discovered the case was diagnosed and treated as neuralgia. In course of time it became apparent that the real nature of the disease was epithelioma of the antrum. No operation was then possible.

# NOTES UPON SARCOMA OF THE TONGUE, BASED ON AN ANALYSIS OF FORTY-FOUR RECORDED CASES.

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PUBLISHED under the designation of "Sarcoma of the Tongue" we have succeeded in finding the reports of 44 cases, the earliest of which was published in 1864 and the latest in 1902 by ourselves in the *Guy's Hospital Reports*, Vol. LVII. Of these 44 cases by no means all can be accepted as true examples of the disease. In some the reports are so meagre, even to the omission of a microscopical examination of the growth, that but little value can be attached to them; whilst in others the history after the operation is so short as to render them of no assistance in our attempt to compute the ultimate prognosis of the affection. Direct communication with the respective authors has, however, elicited replies which have gone far to remedy the latter defects in the reports, and we are much indebted to those who have been good enough to reply to our letters. We have excluded from our table of true sarcomata of the tongue all those cases upon which there appears to us to be room for doubt as to the nature of the growth. Thus ten cases have at once been put aside as being of too doubtful a nature for classification, whilst another, reported by Godlee in the *Transactions of the Pathological Society*, must be placed in a separate category, as it proved on examination to be an adeno-sarcoma arising in the small mucous gland in the side of the tongue described by Blaudin and Nuhn, and not in the connective-tissue substance of the organ. Of the remaining 33 cases, the claim of three to rank amongst lingual tumours rests solely upon the direct extension to that organ of a sarcoma commencing in the tonsil, whilst a fourth is obviously a case of secondary metastatic growth, the primary

lesion being a sarcoma of the lower end of the œsophagus. Twenty-nine cases of true primary malignant connective-tissue tumours of the tongue remain for tabulation, and the majority of these have been recorded during the twelve years that have elapsed since the appearance of Mr. Targett's short monograph in the *Guy's Hospital Reports* of 1890.

## ÆTIOLOGY.

The *age* of the patient varies within wide limits, the youngest being 7 weeks, and the oldest 65 years of age. Thus in 25 cases in which the age is given, there occurred :—

| | |
|---|---|
| Under 15 years - - - - - | 3 cases. |
| Between 15 and 30 years - - - | 9 „ |
| „ 30 „ 45 „ - - - | 7 „ |
| „ 45 „ 55 „ - - - | 0 „ |
| Over 55 years - - - - - | 6 „ |

The *sex* of the patient, in 25 of the cases in which it is stated, shows 17 males to 8 females, or a ratio of only slightly more than 2 : 1 in favour of males, which is a much smaller proportion than that found in carcinoma of the tongue.

The influence of *traumatism* in the production of the growth is suggested by Dunham's case, where the tumour appeared at the situation of a bite of the tongue; in Littlewood's, where it followed upon a scald; and in Marion's, in which it grew at the point of contact with a jagged, carious dental stump. The genesis of sarcoma from a benign tumour is illustrated by Perkins' case, in which a mass had been known to be present in the tongue for many years. The sudden and rapid increase in size of a hitherto benign tumour is analogous to that which occurs in other parts of the body, and, as Perkins says, "its location in the tongue, exposed to mechanical irritation from slight traumatism in the process of mastication and swallowing, may be regarded as a causative factor in the transition from a benign to a malignant neoplasm." Another case, reported by Hutchinson, is probably analogous to those in which hypertrophic structures, such as cutaneous moles and nævi, may take on a sarcomatous development, for here there was an area of rough papillary mucous membrane covering a lingual tumour and increasing

rapidly in size during the year in which it was watched before operation.

Secondary metastatic deposits of sarcoma in the tongue are rare, only one case being recorded, but it is by no means so uncommon for the tongue to be directly invaded by extension of a growth commencing in the tonsil or other neighbouring structure.

## PATHOLOGICAL ANATOMY.

The growth may occupy any part of the tongue and has been described as arising in the connective-tissue substance of the base, sides, or tip, bulging and thinning out the mucous membrane covering it on either the superior or the inferior aspect of the organ. Either side of the tongue may be affected, the growth at first being limited to one side, but later extending across the middle line either by direct invasion of the tissues or, as in our case, by pushing the septum before it. In our list of 29 cases, 13 are stated to have commenced on the left side and 7 on the right. With regard to the position of the growth in the tongue 13 were found in the middle third, 10 in the posterior and 4 in the anterior third.

In all but 2 of the cases the tumour was *interstitial*, that is, embedded in the muscular substance of the tongue, and, by its growth, either directly invading the surrounding tissues, so that on section no definite line of demarcation could be said to exist between the tumour and the healthy tissue, or in those of a comparatively low malignancy, pushing aside, and thus forming for itself a pseudo-capsule of, the compressed tissues around, and remaining circumscribed and sometimes capable of easy enucleation. This apparent encapsulation has in some instances raised a doubt as to the tumour being in reality malignant; but recurrence of the growth has taken place after a simple enucleation, and it has been found microscopically that sarcoma-cells were present between the planes of muscle-fibres surrounding the mass. These peripheral malignant cells must be left behind after a simple enucleation. Growing from the connective tissue in the tongue the mass reaches the mucous membrane, which becomes raised and stretched over it. The mucous membrane is sometimes slightly hyperæmic, but is seldom involved in the growth or

ulcerated, unless it is destroyed by pressure against a carious tooth. The healthy condition of the mucous membrane covering a lingual sarcoma affords an important sign in the diagnosis of these cases, but it is only on the inferior aspect of the tongue that the membrane will be actually movable on the subjacent tumour, for on the superior aspect the covering is normally bound down to the underlying tissues, and thus does not glide over the surface of a growth projecting in this dorsal region. In the majority of cases the growth projects and forms a smooth rounded eminence on the dorsum of the tongue; but in four cases it was the inferior surface which was bulged, while the dorsum remained unaffected, whilst in five others the mucous membrane of both superior and inferior surfaces was raised. In four cases in which the growth originated in the middle and posterior portions of the tongue it had extended downwards in the muscular attachment of the organ to such a degree as to form a swelling in the submaxillary region.

A *pedunculated variety* of lingual sarcoma has been described by Marion and Lichtwitz, but it is probable that in these the growth commenced in the submucous connective tissue and, extending in the direction of least resistance, carried the mucous membrane in front of it, and thus formed a short thick-pedicled mass. The mucous membrane on the surface of the tumour is very much thinned by stretching; and if rupture occurs, as may happen from contact with the teeth or with food, rapid fungation of the growth is usual. The other cases which have been described as pedunculated sarcomata by Mercier, Mikulicz, and Melchior-Robert, are not included in our table owing to their doubtful nature.

The *size* of the tumour varies from that of a small nut to that of an orange. In our own case the mass measured 7 centimetres in diameter, whilst in that described by Porcet it weighed 400 grammes.

## MICROSCOPICAL ANATOMY.

The small- and large-round-celled and the fusiform-celled varieties of sarcoma have each been described as existing in the tongue, but the small-round-celled growths are the most

frequent. The tumours arising in the base of the tongue are chiefly of the small-round-celled variety, but this type is by no means restricted to this situation. It is often a matter of considerable difficulty to differentiate histologically between a lymphosarcoma and hypertrophied lymphoid tissue—a fact of peculiar importance in the microscopical diagnosis of lingual tumours, owing to the large amount of lymphoid tissue occurring in the base of the tongue. The confusion between the two has been accentuated by the use of the term "lymphadenoma" by Continental pathologists to include tumours made up of small round cells supported by a reticulum of connective tissue.

Now small-round-celled sarcomata present, in common with the other varieties, a small but variable amount of intercellular substance which can be picked out by special methods of staining, as, for instance, by picro-nigrosin. Marion, in an article on this subject in the *Revue de Chirurgie*, goes so far as to maintain that cases of lingual tumour consisting of small round cells supported by any intercellular reticulum should be always regarded as lymphadenomata arising in the lymphoid tissue at the base of the tongue, and not as sarcomata. That lymphadenomata occur in this situation is undoubted; but we submit that those tumours which are of rapid growth, which do not diminish in size by treatment with arsenic and iodides, and which recur *in situ* or elsewhere after removal, must be grouped among the sarcomata. In the 29 cases appended 15 are stated to be round-celled sarcoma, 11 spindle-celled, and 1 mixed round- and spindle-celled. In 3 cases there was enough intercellular reticulum to justify the term fibro-sarcoma.

The majority of the recorded cases give but a very meagre account of the microscopical examination, but in most of them mention is made of the presence of numerous capillary blood-vessels permeating the growth in close apposition to the cells, and of the sarcomatous elements at the periphery of the growth penetrating between the adjacent planes of muscle-fibres, which appear degenerated and in part absorbed. The mucous membrane is in nearly all cases stated to be healthy, showing no epithelial downgrowth or papillary change. In the two pedunculated cases the sarcoma-cells could be traced from

the tumour through the pedicle into a small mass of growth in the tongue immediately subjacent.

### SYMPTOMS.

The commencement of the growth is insidious and painless, the patient's attention being first drawn to the tongue by some inconvenience of articulation, mastication, or deglutition. If the growth is situated in the *anterior part of the tongue* there is a localised increase in volume by a tumour embedded in its substance, and the patient's attention is apt to be first attracted to it by the fact that he frequently bites the affected side. The tumour increases more or less rapidly in size, causing an elevation on one or both aspects of the tongue; the mucous membrane over it is stretched, and often displays numerous ramifying blood-vessels. The mucous covering on the inferior aspect is freely movable on the tumour, while on the dorsal aspect it is, as in the normal tongue, bound down to the underlying structures. The tumour is firm and elastic to the touch, gives no sense of fluctuation, and its border is ill defined.

If the growth arises in the *middle third of the tongue* it usually projects on the dorsal aspect, presenting features in common with those mentioned above, altering the shape and volume of the organ according to its position and size. Whereas tumours in the anterior portion of the tongue are early noticed by the patient, those in the middle third usually attain a greater size before attracting attention, when, upon examination, the mass may be found to be already pushing upon the soft, and the posterior part of the hard, palate, hiding the faucial pillars of that side and causing some difficulty in deglutition. By its extension downwards between the muscles of the tongue the growth may push forward the mucous membrane of the floor of the mouth at its reflection on to the inferior surface of the tongue, and by its further increase in size it may cause a distinct bulging in the submaxillary region. It can then be grasped bimanually by the fingers of one hand in the mouth and of the other beneath the mandible. The submaxillary bulging is unilateral and forms a smooth, rounded mass which may extend beyond the median line of

the neck. The tumour is everywhere firm and elastic in consistence, and is covered dorsally by normal mucous membrane. The movements of the tongue are limited, especially that of protrusion, causing some alteration in speech; and if large, the mass may cause difficulty in swallowing or in respiration.

A growth of the *posterior third of the tongue* usually causes no symptoms until it has attained sufficient size to interfere with deglutition. The patient first notices difficulty in swallowing solid food, and this disability increases until only fluids can be taken. Later there is superadded difficulty in respiration, with perhaps attacks of dyspnœa. Upon examination of the buccal cavity it may be that nothing abnormal is seen, and that it is not until a finger is passed into the oro-pharynx that a tumour is found projecting from the posterior surface of the tongue into the pharyngeal cavity. As in the anterior two-thirds of the tongue the tumour is firm and solid, covered by normal mucous membrane, and palpable from the outside, below and behind the angle of the lower jaw. The voice is altered, but a laryngoscopic examination is prevented or obscured by the mass.

The *mucous membrane* covering a lingual sarcoma is in most cases thinned and healthy. In the four cases in which it was ulcerated this was probably due to contact with the teeth or with food during mastication. The ulcers presented no characteristic feature; the edges were neither raised nor thickened, nor were the bases excavated. They bled readily on manipulation and during mastication.

In whatever portion of the tongue the growth starts its increase in size, in spite of drug-treatment, is rapid and progressive. The length of the clinical history in 20 cases varied from 2 months to 2 years, and gave an average of 6 months' history before operation.

The pedunculated variety of lingual sarcoma described by Marion and Lichtwitz consists of a small, rapidly-growing, flattened tumour attached to the tongue by a short, thick pedicle, through which an extension of the growth can be traced into the tongue. The mucous membrane around the pedicle is healthy, but over the surface of the projection it is thinned, and, in Marion's case, was ulcerated from contact with the teeth. It is probable that in these cases the growth

originates in the sub-mucous tissue, and, extending in the direction of least resistance, pushes the mucous membrane in front of it and thus becomes pedunculated.

*The lymphatic glands* in the submaxillary space were enlarged in 6 cases out of the 29 and in 3 of these they showed sarcomatous infiltration on examination after removal. It is noteworthy that, while of these 6 cases presenting glandular enlargement 3 were accompanied by ulceration of the mucous membrane of the tongue, yet the glands were sarcomatous in 2, and purely inflammatory in only 1. Of the remaining 3 cases presenting glandular enlargement without there being any ulceration, in only 1 is the nature of the enlargement stated, and then it was sarcomatous. In 11 cases only is it definitely mentioned that there was no glandular enlargement, but it is probable that had they been enlarged in any of the remaining cases the fact would have been noted in the report. After removal of the primary lingual sarcoma recurrence has been noted to occur once in the cervical glands alone, and on four occasions in the glands, as well as in the site of the previous operation in the mouth. It may therefore be said that secondary deposits in the lymphatic glands are exceptional, but may occur with sarcoma of the tongue.

The *submaxillary salivary gland* was found enlarged in 3 cases: in 2 of these it was removed and examined microscopically, and the enlargement was proved to be merely inflammatory, while in the third case it was left *in situ* at the operation for the lingual tumour, and it regained its normal size in a fortnight. It is possible that in these cases the enlargement is due to pressure on Wharton's duct by the growth in the tongue.

*Pain* in the tongue is exceptional, and if present is usually accompanied by, and due to, ulceration of the lingual mucous membrane.

*Hæmorrhage* may occur but only in those exceptional cases in which there is ulceration.

*The general health* of the patient remains good until secondary visceral deposits have appeared, or until the mass has attained sufficient volume to interfere with deglutition or respiration.

## DIAGNOSIS.

The functional troubles due to the volume of the tumour, viz., the limitation of movement of the tongue and the consequent difficulty in speech and deglutition, cannot be said to be especially marked in sarcoma, and the diagnosis of this disease must be based chiefly upon a knowledge of the clinical history of the case and upon the elimination of tumours that might simulate it. Histological examination of a small piece removed from the growth would prove of great value in doubtful cases, but such a proceeding is likely to be followed by a rapid fungation if the growth is malignant.

Perhaps the most common lingual tumour with which sarcoma is likely to be confounded is *gumma*, especially when the latter is single and deeply embedded in the tongue. A gumma of this character placed in the middle or side of the tongue may cause a rounded elevation on the dorsal aspect covered by thin, smooth, and healthy mucous membrane. But in a short time a gumma shows signs of degeneration; the mucous membrane over it becomes pale and yellowish, and eventually gives way, exposing a "wash-leather" slough, and later it leaves an ulcer with ragged base and undermined edges. If seen before ulceration has taken place, the association with other syphilitic lesions and the rapid diminution in size of the tumour under large doses of potassium iodide will point to its gummatous nature. Lastly, gummata of the tongue are frequently multiple, especially the superficial variety, whilst sarcoma has in all the cases hitherto reported been single.

It could only be quite an early stage of *carcinoma* of the tongue that might be confused with sarcoma. If the tumour is placed on the inferior aspect of the tongue the free mobility of the mucous membrane at once excludes carcinoma; if on the dorsum a carcinoma shows more definite fixity of the mucous membrane, with infiltration extending into the lingual substance, whereas a sarcoma is embedded in the tongue, and can be felt to be independent of the mucous covering, which, however, as already explained, is not in this situation freely movable over the growth. In cases in which the tumour has increased to a more considerable size, there is little chance of error, for in a carcinoma of such standing the mucous

membrane is almost certain to have given way, leaving a characteristic epitheliomatous ulcer with hard, uneven, and everted edges; whereas when the mucous covering of a sarcoma has given way the resulting ulcer has ragged edges, and is placed upon the surface of a tumour embedded in the actual muscular substance of the tongue. If there is any reasonable room for doubt, a microscopical examination of a small piece can be made, provided only that the patient is willing to submit at once, if found necessary, to a radical operation. Two other facts to which some weight may be attached are the comparative rarity of sarcoma and the different ages at which each disease occurs, sarcoma being most common between 15 and 30 years, carcinoma between 40 and 60 years. Another factor, though not so important as the age, is the sex of the patient, for whereas carcinoma occurs seven times more frequently in males than in females, sarcoma is only twice as frequent.

Other tumours of the tongue to be considered in the diagnosis are in themselves almost as rare as sarcoma, but mention must be made of cysts and benign growths. Of the *cysts*, a dermoid is nearly always situated in the median line, projecting both into the floor of the mouth and in the suprahyoid region, forming a clearly-defined, globular, tense and, indeed, often non-fluctuating swelling. Mucous and parasitic cysts are recorded, but, unless translucent or fluctuating, could only be diagnosed by an exploratory puncture or incision. A *chronic abscess* lies just under the mucous membrane, is small, moderately soft and fluctuating, and usually placed on the dorsum of the tongue in front of the circumvallate papillæ. It is of very slow development, and may be associated with tubercular lesions elsewhere in the body. *Actinomycosis* has been recorded by Hebb, forming a tumour in the tongue. It is very rare, of slow development, and finally softens and ulcerates. On incision, the contents would show the yellow granules of the fungus.

*Innocent solid tumours*, such as fibromata and lipomata, are extremely slow in their growth, sometimes taking 10 or 15 years to reach the size of a small walnut, and are hence readily distinguished from sarcoma. The colour of a sarcoma more nearly resembles that of the surrounding tissue, than

is the case with benign growths; and whereas a sarcoma in its growth will alter the contour of the surrounding parts, a benign tumour is more apt to conform to its surroundings.

## PROGNOSIS.

It is difficult to formulate from the comparatively small number of cases that have been reported, any reliable rules for guiding the ultimate prognosis. Of the 29 cases, 25 were operated upon, with the result that 11 recovered, and were known to have been well for a varying period. We have attempted to obtain the post-operative histories of all these cases, and we find that they have been free from recurrence for the following periods—13, 12, 9, 4, 4, 3½, 3, 2, 2, 1½ years and 6 months. The first seven may probably be considered cures. In 13 cases, that is in more than 50 per cent. of those operated upon, recurrence took place, necessitating further operative measures. Of these, 3 were well for periods exceeding 2 years, and 9 eventually died from recurrence. Of the 9 cases that died from recurrence of the growth, 3 died in a short time from rapid spread of the disease, and the others after an interval of 9 months, 1½, 2½, 2½, 3, and 3½ years respectively, from the first onset of the disease. One case was deemed inoperable when first seen, and died soon after; another died from pneumonia eight days after operation, and in the remaining four the after-history cannot be obtained. Of the 13 cases in which recurrence took place, it was in 9 instances at the site of the previous operation, in 1 case in the lymphatic glands of the neck alone, and in 4 in both the original site and the glands. The immediate cause of death was found to be secondary metastatic deposits in the brain in 1 case, in the lungs in 2, and in the peritoneum in 2 cases.

Though the behaviour of sarcomata elsewhere in the body might lead us to expect that cases of the fusiform-celled variety would show a better prognosis than those of the round-celled type, yet the differences in the results in our 29 cases are by no means striking in this respect. Of 12 cases of the spindle-celled variety, 4 recovered and remained free from recurrence for periods of 12, 4, 2, and 2 years respectively; 6 recurred within 2 years, 2 of them dying shortly after the

operation, and 1 in 1½ years from cerebral metastasis. In the round-celled type, 4 cases were free from recurrence for longer than 3 years, 6 recurred within 2 years of the operation, and 5 died at varying periods ranging from 9 months to 2½ years. Only one death was immediately attributable to the operation, and that was caused by pneumonia after a week's interval.

## TREATMENT.

One point which appears to be very emphatically demonstrated by a perusal of the cases we have collected is that these tumours should be *widely* removed by an incision into the healthy lingual tissue well clear of the growth; for though the ease with which the obvious new growth can sometimes be enucleated is very tempting, yet such a method of separation from the surrounding compressed structures is extremely liable to be ineffectual in removing all traces of the growth, and the pseudo-capsule remaining will contain the nucleus for a recurrence at a later date. In the case of a quickly-growing sarcoma which has invaded the tongue extensively, no doubt the more drastic measure of excision of the anterior two-thirds or of the whole organ would give the patient a better chance, despite the increased risk of the operation itself. The question which method of operation is most applicable depends on the nature of each individual case, and among other things upon the situation and the volume of the tumour. Small tumours of the anterior part can be attacked from the mouth; those placed in the middle third of the tongue can be more easily reached by dividing the cheek; but those cases in which the growth has extended downwards in the muscular attachment of the tongue and can be felt in the submaxillary region, whether projecting in front of or behind the circumvallate papillæ, demand a supra-hyoid incision, opening up the floor of the mouth or the pharynx as the case demands. Such operative details as preliminary ligature of the lingual artery or tracheotomy will be governed by the same rules as apply in operations for lingual epithelioma.

If recurrence should ensue the secondary tumour must again be removed and widely.

Any enlarged lymphatic glands present when the case is first

seen should be removed at the operation or at a later date, for although their enlargement may be purely inflammatory, yet they may be affected with sarcoma, and it is impossible to determine this from their clinical aspect. Sarcomatous enlargement of the glands of the neck following the removal of the primary lingual growth makes the prognosis grave; but they should be removed if possible, for some of our cases (notably 17 and 18) show a most satisfactory ultimate result even after two operations for removal of such secondary growths.

For those cases which are deemed inoperable, either from the first or owing to the extensive degree of recurrence, treatment must be directed to the alleviation of symptoms—such as dysphagia, asphyxia, and pain. The only remaining hope lies in a recourse to injections of Coley's fluid, but (with the exception of one case, which we have not felt justified in including), there is no instance amongst the published cases of a lingual sarcoma in which treatment by any form of injection has been tried.

## CLASSIFICATION.

It will be seen that the cases of sarcomata arising in the muscular substance of the tongue fall naturally into the following groups, which we have somewhat modified from the classification used by Butlin and Spencer in their new edition of *Diseases of the Tongue.*

(a) *Sarcomata of a relatively benign character.*—Cases 1 to 11 in our list seem to have been of this nature. They cause an elevation upon one or both surfaces of the tongue without glandular enlargement. They are comparatively slow in their growth; are circumscribed, but show no distinct capsule; and are usually separated with ease from the surrounding healthy tissue. As has already been pointed out, they may recur *in situ* after simple enucleation from their bed, so that it is most advisable to cut wide into the healthy tissue around when operating for their removal. Microscopically either the round or the spindle-cells may predominate.

(b) *Sarcomata of a more malignant form.*—Cases 12 to 20. These are almost certain to recur after removal and to require further operation at an early date, unless the primary

operation has been carried wide of the growth. They are prone to involve the submaxillary or cervical lymphatic glands. We have shown that the enlargement of lymphatic glands may be due to sarcomatous infiltration even when there is no ulceration of the mucous membrane over the primary tumour, and that recurrence of the growth in the glands may be unaccompanied by any fresh growth in the mouth after removal of the primary mass. The cases in this class always show much more rapid enlargement of the primary tumour, and usually an early recurrence, either *in situ* or in the glands of the neck. In the majority of cases in which the after-history has been obtained they are seen to have quickly ended fatally. The small-round-celled variety of sarcoma is the common form in this class.

(c) *Sarcomata originating at the Base of the Tongue*, that is to say, in that part of the organ behind the circumvallate papillæ, which is developed by two lateral halves from the second and third visceral arches, as distinct from the anterior two-thirds of the tongue in front of the foramen cæcum, which is derived from the median tuberculum impar.—Cases 21 to [illegible]. These growths are distinguished by position rather than by other features from the classes mentioned above, and they may be either of the round or spindle-celled form. They have in most instances already attained a large size before any [illegible] wrong is perceived by the patient, and therefore they usually required an extensive operation for their removal. They vary in varying degrees of malignancy, and the particular tendency they manifest to recur locally is possibly attributable to the extensive infiltration of the neighbouring structures before the operation is undertaken.

A separate class has been made of these cases because confusion has arisen between them and the lymphadenomatous tumours originating in the lymphoid tissue of this part. The latter growth may form a mass steadily growing in the base of the tongue and accompanied by glandular enlargement in the neck, but arrested in development and disappearing under treatment with drugs, such as arsenic or iodide of potassium, whilst a sarcoma will be but temporarily, if at all, affected by such means. Microscopical examination may afford valuable distinction between such an innocent lymphatic enla[illegible]

HE TONGUE ACCEPT

| | Treatm |
|---|---|
| terior half of tongue | |
| e removed behind growth | |
| ur - - | |
| e. Recurrence in two year | |
| axillary operation | |
| ur - - | |
| on into tissues around | |
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| rence in two years and righ | |
| e removed - - | |
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| recurred *in situ* and furthe | |
| e and glands - | |
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| urrence. Wide removal a | |
| tongue amputated. Rec<br>ner removal. Recurrence<br>rence. Further removal | |
| tongue - - | |
| e by supra-hyoid pharyng | |
| ne by supra-hyoid incision.<br>ds. | |
| e - - | |
| e and part of pharynx | |
| - - - | |
| mour with cautery - | |
| Recurred in twelve months<br>nty months by recurrence | |

and a small-round-celled sarcoma, so that the diagnosis in these cases must rest mainly upon clinical evidence.

(d) *Sarcomata following upon Lymphangiectasis.*—The cases described by Eve and Perkins (28 and 29) appear to have been preceded by lymphangiectasis from which the malignant growth started.

(e) *Sarcomata arising in the Glandular Elements of the Tongue,* as in Godlee's case, in which the growth commenced in the mucous gland of Blaudin.

(f) *Secondary Sarcomata in the Tongue.*—Only one case of true secondary sarcoma of the tongue can be found, and in this the primary growth was situated in the lower end of the œsophagus. In another case reported as a secondary growth it is not at all clear that the tumour in the tongue was not a direct extension from the primary growth in the tonsil.

# INFLAMMATORY AND OTHER NEOPLASMS OF THE JAWS DEPENDENT ON TEETH.

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[With Plates LX.–LXIX.]

GROWTH, whether inflammatory or tumour-growth, induced by diseased teeth is obviously due to some irritant dependent on the latter. This irritant may be mechanical, as in the case of a sharp edge to a broken-down tooth, or the product of some vital (mycological) activity, when either the toxines, or the organisms, or both, act as the irritant. The path of entrance of these vital irritants is either by the pulp-cavity and root-canals after exposure and death of the pulp by caries—chiefly *vid* the apical foramen, but partly by soakage through the dentine of the root—or as in pyorrhœa alveolaris, or in the case of débris accumulated under tartar, by way of the small annular sulcus which normally exists between the neck of the tooth and the gum.

The actual growth may consist of both epiblastic and mesoblastic tissue, the epithelial growth taking place from the epithelium of the gums or from the microscopic epithelial balls normally found in the alveolar-dental ligament; and cases will be quoted to show that malignant tumours, both carcinomatous and sarcomatous, may owe their origin to the irritation of diseased teeth.

And herein lies the importance of the subject—that these "growths" of the mouth, some of which are merely disfiguring, while others are truly malignant, owing their origins to diseased teeth, can all be prevented by due attention to dental hygiene.

The study of "growth" due to diseased teeth is interesting both from the importance of recognising the pathological conditions to which diseased teeth may give rise, and from the difficulty met with in many cases in deciding, either on clinical or histological grounds, whether a particular growth is truly inflammatory, or whether it has passed that stage and become

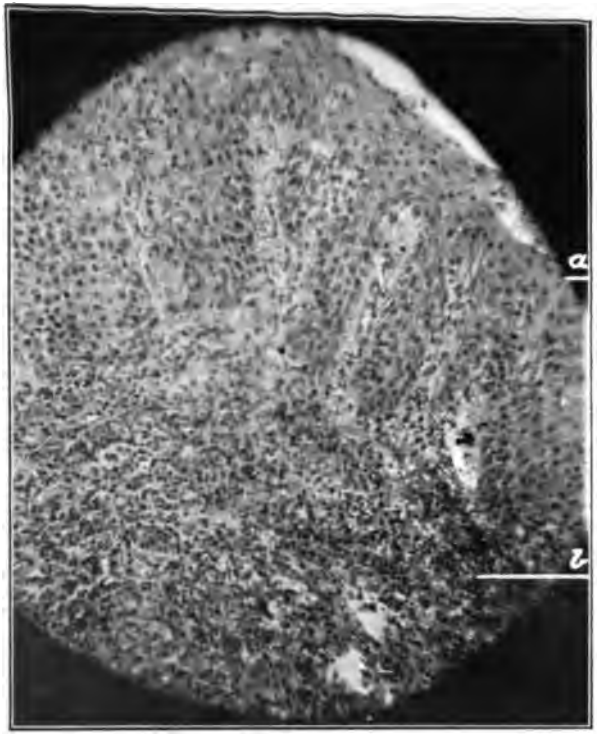


Fig. 1. *Section of a small inflammatory "polypus" of the gum.* a. *Epithelium.* b. *Inflammatory infiltration—interstitial granulation-tissue.* × 250.

Fig 2. *Section of "polypus" of gum of chronic inflammatory origin. The body is made up of new-formed fibrous tissue and cells of inflammatory origin.* a. *Pedicle.* × 30.

Fig. 3. *A "fibrous epulis"—fibroma—of gum, of inflammatory origin. The tumour was pedunculated. Natural size.*

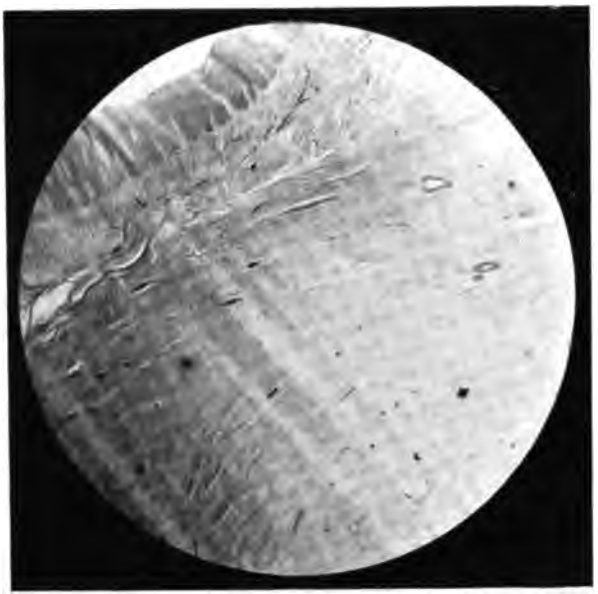

Fig. 4. *Section of an inflammatory fibrous neoplasm growing from the maxillary tuberosity. Blood-vessels are scanty. The base was coëxtensive with the tuberosity.* × 30.

a true tumour—innocent or malignant. Indeed, there seems to be here a possibility of discovering what it is, in this part of the body, which changes reparative or inflammatory hyperplasia into malignant tumour-formation, or induces malignant disease where at other times one only finds inflammatory or innocent growth.

For purposes of description division will be made into:—(1) Conditions arising in the gum; (2) conditions arising in the periodontal membrane; (3) conditions arising in the bone.

### I.—CONDITIONS ARISING IN THE GUM.

Localised inflammatory hyperplasia of the gum (one form of "polypus" of the gum), found in connection with broken-down teeth and septic roots, appears first as a small tag of gum, more or less evidently inflammatory in origin according to the acuteness of the inflammation. Fig. 1 shows a section of obviously inflammatory tissue; Fig. 2 a section of a tag of similar origin, but far less obviously inflammatory. From such a piece as this latter a mass such as is figured in Fig. 3 would develop. This mass was growing from among broken-down roots on the left side of the upper jaw, and had been noticed eighteen months. Microscopically, it consisted of "fibrous tissue with a large quantity of inflammatory cells." Obviously such a mass showing persistent growth might, clinically, be fitly described as a fibroma.

General inflammatory hyperplasia of the gums occurs in connection with tartar and pyorrhœa alveolaris, either singly or in combination; also in the anterior part of the mouth in mouth-breathers. In all these conditions bacterial irritants are at work, while tartar adds a mechanical factor, the influence of which is the greater in presence of bacteria. Sometimes the teeth are almost hidden by the masses of gum. In a case which I saw the hyperplasia seemed to have undergone malignant development in one part—the right side of the upper jaw—where a large rapidly-growing fungating mass grew from the alveolus, extending from the canine tooth backwards to the second molar. The patient has remained without recurrence after free removal of the alveolar portion of the jaw three years ago. Microscopic examination leaves the question of

sarcoma uncertain. The hyperplastic condition of the rest of the gums (upper and lower) subsided slowly after thorough scaling of tartar and germicide treatment. The amenability of this form of overgrowth to such cleansing treatment will permit of its differentiation from true "hypertrophy of the gums."

A suggestive case is recorded by Kenneth Goadby of a lady, æt. about 50, who suffered from pyorrhœa alveolaris with great overgrowth of the gums, the teeth being actually covered in parts of the mouth. The patient refused treatment, and six months later developed symptoms of intra-cranial tumour—strabismus and headache—of which she soon died. *Post mortem* a sarcoma of the brain was found, which seems to have been secondary to the state of the gums.

Local or general fibrous hyperplasia of the muco-periosteum is met with, especially on the tuberosities of the maxillæ, and is due to the chronic irritation of diseased teeth. Fig. 4 shows a section of a mass formed by such hyperplasia. The patient had pyorrhœa alveolaris and many dead and septic teeth. On each maxillary tuberosity was a large fibrous mass, and the third upper molar teeth were dead and septic; further forwards there was general hyperostosis of the bony alveolus. The masses touched the base of the tongue, and induced a distressing retching in a nervous patient, which was permanently relieved by their ablation.

In treating these cases it is not enough to take out the diseased teeth, since the fibrous growth shows no tendency to involute, though, on the other hand, I have never seen any further increase in size after extraction of the diseased tooth. If the masses are an inconvenience they must be cut away.

Epithelioma may arise in the gums round carious teeth, or round teeth which, though free from caries, are furred with tartar round their necks, or are the subjects of pyorrhœa alveolaris. Fig. 5 shows the epithelial proliferation (ingrowth from the gum) which may take place in pyorrhœa, and it is easy to see that this may become malignant (*cf.*, leucoplakia of the tongue). Fig. 6 shows the extent of an epitheliomatous growth which began round the upper teeth (between the molar and bicuspid of the right side) in a man aged 68. The teeth were the subjects of "chronic acute" pyorrhœa,

*a.*

Fig. 5. *Section of gum and periodontal membrane from a case of pyorrhœa alveolaris. The parts were greatly thickened by inflammatory cells—subacute inflammation and the epithelium of the gum shows irregular overgrowth at* a. × 250.

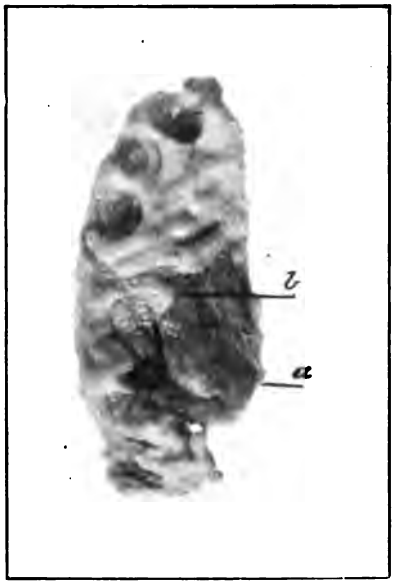


Fig. 6. *Epithelioma of gum of upper jaw, spreading on to palate. It originated at* b *on the alveolus, between the molar and bicuspid teeth.* a *points to the ulcer, of a dark shade in the photograph. The specimen has been decalcified for sectionising. Natural size.*

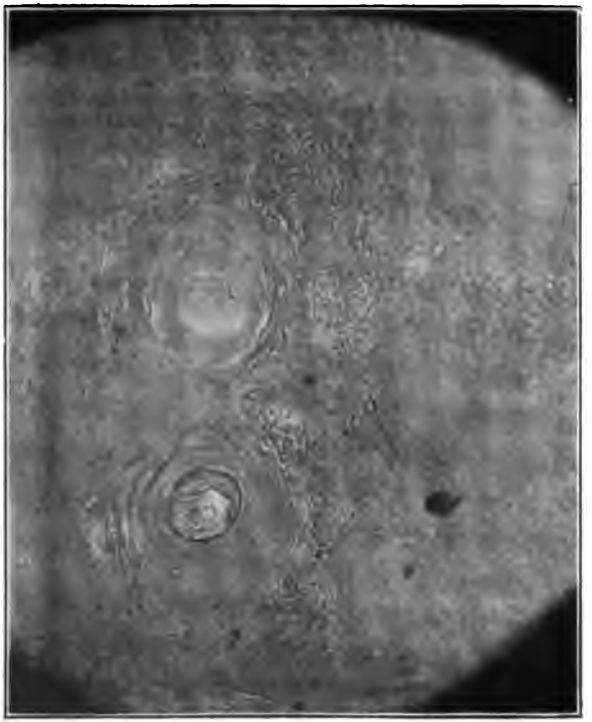

Fig. 7. *Cell-nests from a piece of tissue taken from preceding case.* × 250.

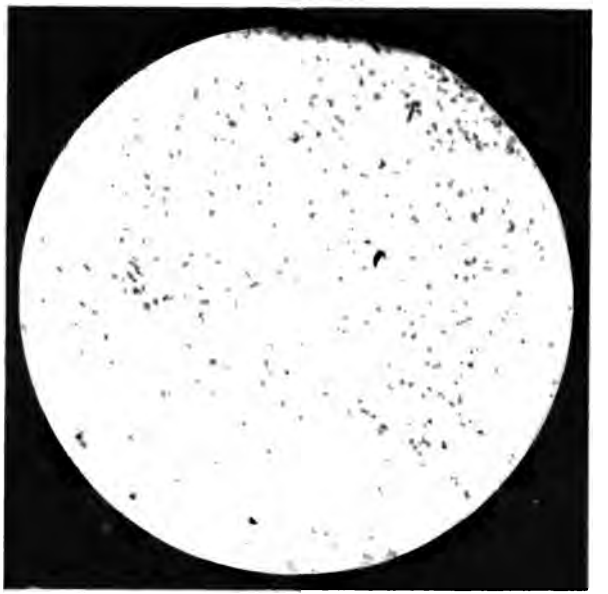

Fig. 8. *Section from the chronically-inflamed periodontal membrane round a "sub-septic" root, showing formation of new fibrous tissue: blood-vessels are scanty.* × 250.

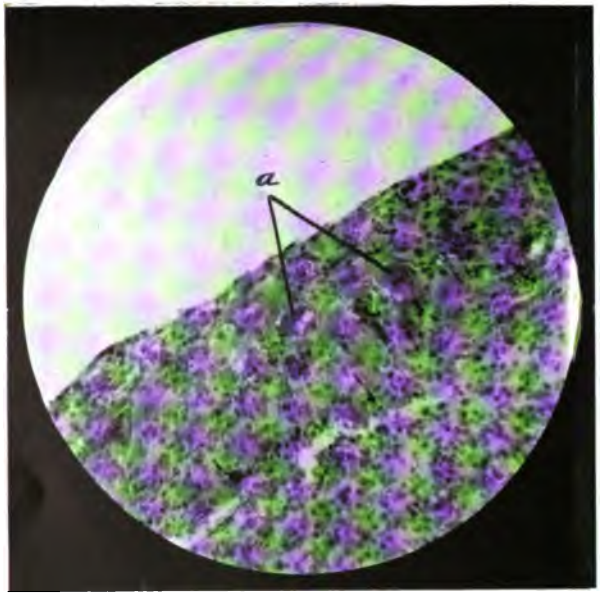


Fig. 9. *From an inflammatory neoplasm at the root of a tooth.* a. *Myeloid cells.* × 250.

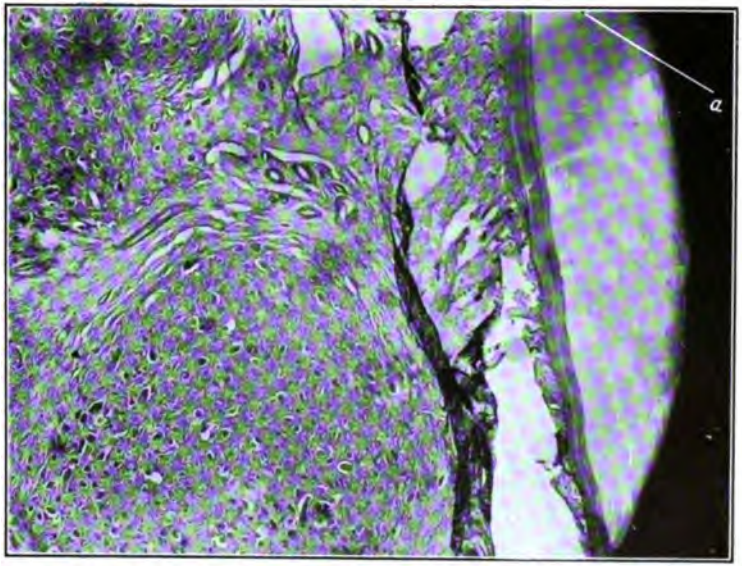


Fig. 10. *Section from a myeloid sarcoma of the alveolus.* a. *Dentine of root.* × 35.

that is to say, there was a constant discharge of pus from the sockets, and the gums were kept constantly inflamed and tender. The disease began as a white patch of epithelial proliferation, and fourteen months later had attained the size shown in the illustration. The growth was slightly raised, but nowhere hard. There was in the last six months constant gnawing pain. The antrum was free from disease. Death followed in about a year from recurrence in the deep glands of the neck. Microscopic examination showed the growth to be epitheliomatous (Fig. 7).

## II.—GROWTH BEGINNING IN THE PERIODONTAL MEMBRANE.

1. *Fibroma.*—Sections of the periodontal membrane of dead and chronically-septic roots (Fig. 8) often show considerable formation of fresh fibrous tissue (blood-vessels are very few in these sections), and, from such a beginning, fibroma of the jaw may very possibly arise. Heath (*Injuries and Diseases of the Jaws*, 4th edition, p. 264) inclines to the opinion that fibroma may have such an origin; and his description of the manner in which a fibroma of the upper jaw may either crush in the antrum, though not involving its interior, or produce complete absorption of its walls and occupy its cavity, is entirely in accord with the course of growth followed by dental cysts which undoubtedly arise round the roots of teeth (*vide infra*).

2. *Sarcoma.*—From what has just been said it is very probable that fibro-sarcoma may have an identical origin, but clinical evidence is difficult to obtain. In the case of myeloid sarcoma the evidence is more abundant. Fig. 9 shows a portion of a mass of tissue from the root of a diseased tooth, in which myeloid cells were found in considerable number. In this case there was no definite myeloid sarcoma, but a small dental cyst was found in the mass. There has been no recurrence after two years. Fig. 10 shows a section of a lead root found in the middle of a "myeloid epulis." In two cases in children I have seen fungating myeloid sarcoma arising round the roots of dead temporary teeth; in both cases at operation the base of the jaw was left and no recurrence has taken place after three and five years respectively. Fig. 11

shows a myeloid sarcoma of some three years' growth, in a patient of 28, in the midst of which was the root of a carious second lower molar. The mass grew from the alveolus as a base or stalk, and projected outwards to the cheek like the one side of a mushroom : the tongue restrained growth in the other direction. Here again the base of the jaw was left, and there has been no recurrence a year after operation. These cases show rather strikingly the comparative innocence of myeloid sarcoma arising round dead roots, and their tendency to fungate rather than infiltrate.

Fig. 12 shows a section of an endothelioma which began round the roots of a dead and carious lower molar tooth. Three years before operation the patient consulted a surgeon on account of a swelling at the root of the left lower second molar. Since all the molars were dead and carious the opinion was expressed that it was inflammatory. The teeth were extracted, but the tumour increased in size ; and when operated on by excision of the left half of the jaw, presented all the appearances of a central growth of the bone, the gum being intact over it, except where the second molar tooth had been extracted. It had, however, extended so far back that it was considered well to resect the condyle. In spite of free resection the tumour recurred in the base of the tongue.

In the case of a youth of 18 an alveolar sarcoma developed rapidly round the roots of a broken-down left first lower molar. The growth was thought to be inflammatory and seemed to fluctuate, but on incision proved solid. Microscopic examination showed its malignant nature, and the left horizontal ramus was excised. Metastasis occurred round the septic roots of the decayed right upper second molar, and the boy died in two months from the time he first noticed the trouble with sarcomatous growth in almost every organ of the body.

On the other hand not every neoplasm which excites suspicion is malignant. A youth of 17 attended at the Royal Dental Hospital with a soft swelling, the size of an orange, on the left side of his hard palate, which had come up quickly and almost painlessly a few days before. Its centre was opposite a dead first molar tooth, which was extracted. During the next two weeks the swelling slowly subsided to about a

Fig. 11. *Photograph from a cast of a myeloid sarcoma alluded to in the text.*

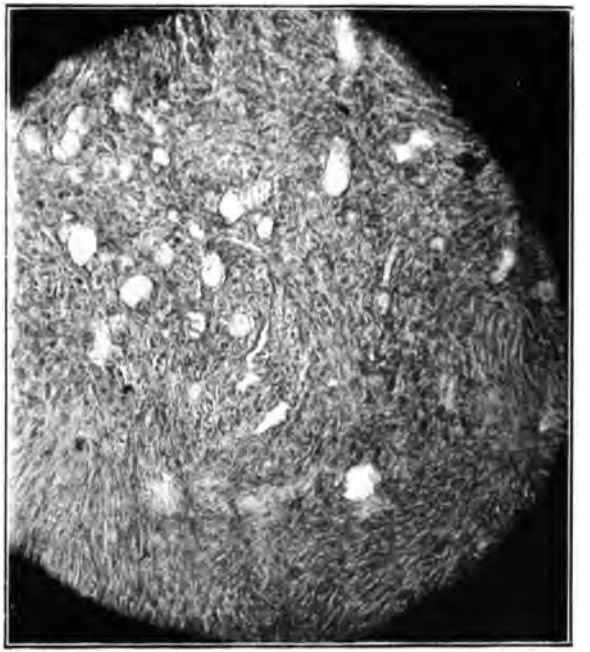

Fig. 12. *Section of an endothelioma arising at the root of a dead tooth. Some of the cell-masses have fallen out in preparing the section.*

third of its original size; but it then began to show signs of growing at its periphery under the muco-periosteum of the hard palate, where it soon presented, especially at the anterior part, a firm extension giving rise to suspicion of malignancy. The patient was admitted to St. Thomas's Hospital, where a piece was excised for microscopic examination. The pathologist reported that there was no sign of malignancy; and the patient was given iodide of potash under which the swelling soon disappeared. No history of syphilis could be obtained, but the case may have been one of congenital syphilis.

EPITHELIAL GROWTH IN THE PERIODONTAL MEMBRANE.

*Dental Cysts.* — In the normal periodontal membrane little bodies of epithelium, the remains of the enamel-forming organ, are found. When the periodontal membrane becomes chronically inflamed, as round septic roots or in cases of pyorrhœa alveolaris, these little masses behave as does epithelium anywhere else under similar circumstances, viz., they proliferate. The enlargement may form one excentrically-growing body, but more commonly forms a spongework, which on section shows an epithelial reticulum enclosing masses of inflammatory cells, and surrounded by the fibrous remains of the periodontal membrane, or by newly-formed fibrous tissue. Whatever the form of overgrowth taken, the central part soon breaks down and forms at first a white pultaceous mass, resembling inspissated pus to the naked eye and containing numerous crystals of cholesterin. Fig. 13 shows a section of the epithelial spongework of the early stage of a dental cyst, and Fig. 14 a more highly magnified part of the same.

Fig. 15 shows a section of a small mass which has enlarged excentrically to an oval shape without formation of a spongework. In this case, as not very infrequently happens, the epithelium is of the columnar ciliated variety (Fig. 16). As the cyst grows, the reticular appearance tends to disappear; but remnants of it are easily found on section of the walls of a cyst of the size of a small hazel-nut. The epithelial lining of a large-sized cyst is seldom as regular as in Fig. 17, but at many points shows commencing ingrowth. In one cyst of large size numerous microscopic cysts and solid epithelial

masses were found in the wall. The epithelium was columnar and ciliated (Fig. 18).

The similarity in structure and growth to "epithelial odontome" is obvious.

Dental cysts are of progressive growth, and may attain large size. In the lower jaw they separate the outer plates of the bone, and in one case left after operation a cavity extending from the incisors to the third molar. In the upper jaw they hollow out the bone, and push out, expand, and perforate the palate and buccal walls of the bone. The antrum is either pushed up till it may be a mere slit under the orbit, or its floor is treated as are the other bony walls of the body of the bone (*cf. supra* Fibroma)—pushed in, thinned, and perforated.

The growth, except when inflamed or suppurating, is painless; and nerves are pushed painlessly aside, having time to accommodate themselves to their slow dislocation. In the upper jaw a dental cyst, especially if it have suppurated, is often mistaken for antral empyema. The distinction may be made by remembering that pus pent up in an antrum, or elsewhere, never yet produced signs of true tumour-growth. If it is pent up in an antrum there will not even be, except in very rare cases, deposit of inflammatory new bone. All the symptoms are those of inflammation, and all the swelling is inflammatory, affecting the soft parts.

If it is possible, then, to distinguish that there is true bony swelling; or that the bony swelling has been absorbed at its most prominent part, leaving a possibly fluctuating area (according to the state of tension of the contents) surrounded by an edge of bone; or if there is a large fluctuating area over which no bone can be felt, and which is not inflammatory, the case cannot be empyema antri, but is most likely cystic, and a dental cyst is by far the commonest cyst of the jaw.

*Epithelioma*, arising in the periodontal membrane is sometimes met with, and is one of the forms of boring epithelioma. Fig. 19 shows a section of a case related by Mr. Stanley Colyer, in which the process began round a dead upper central incisor and spread backwards in the bone. There was no external sign of tumour-growth, but a fleshy mass adhered to the tooth on extraction, which proved epitheliomatous on microscopic

Fig. 13. *Section through the epithelial spongework of the early stage of a dental cyst before breaking down has occurred in the centre.* a, a'. *Epithelial trabeculæ.* × 35.

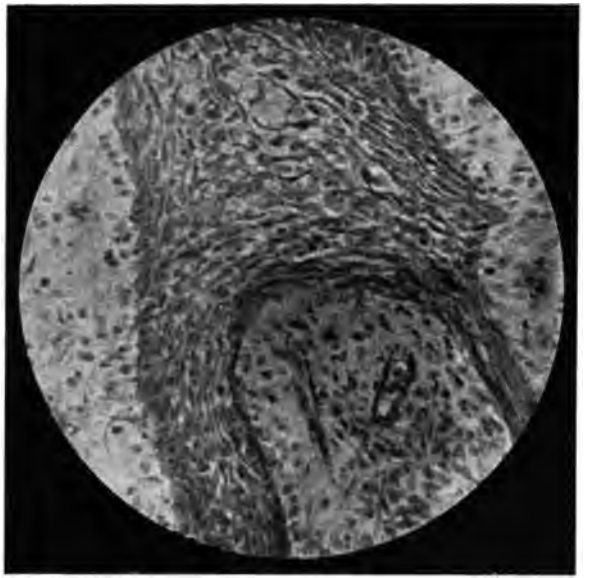

Fig. 14. *Piece of epithelial network more highly magnified, from* a' *of previous Fig.* × 250.

# PLATE LXVII.

Fig. 15. *Section of a small dental cyst which has enlarged excentrically, without formation of an epithelial sponge-work. The epithelial lining is columnar and ciliated.* × 30.

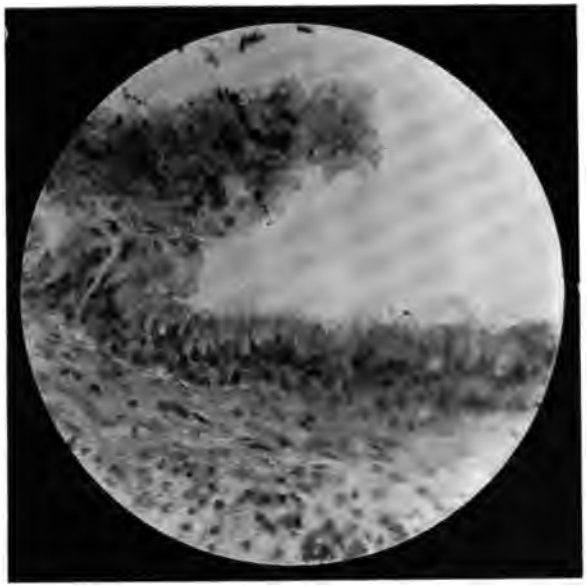

Fig. 16. *Piece of epithelial lining from* Fig. 15, *showing ciliated epithelium.* × 300.

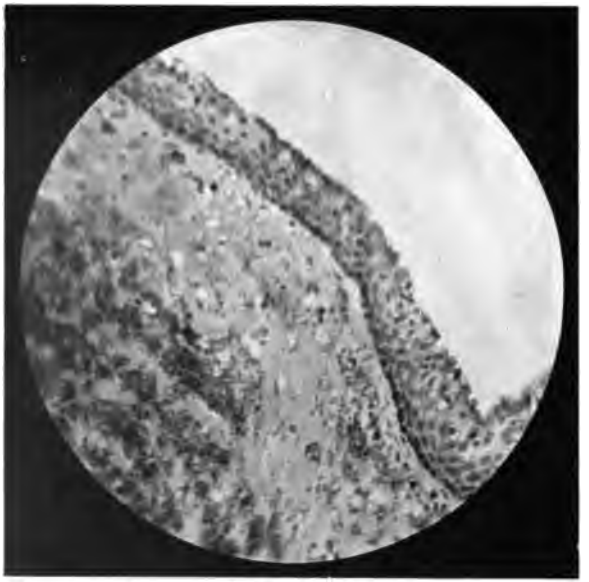

Fig. 17. *Section of the wall of a dental cyst, showing epithelial lining.* × 250.

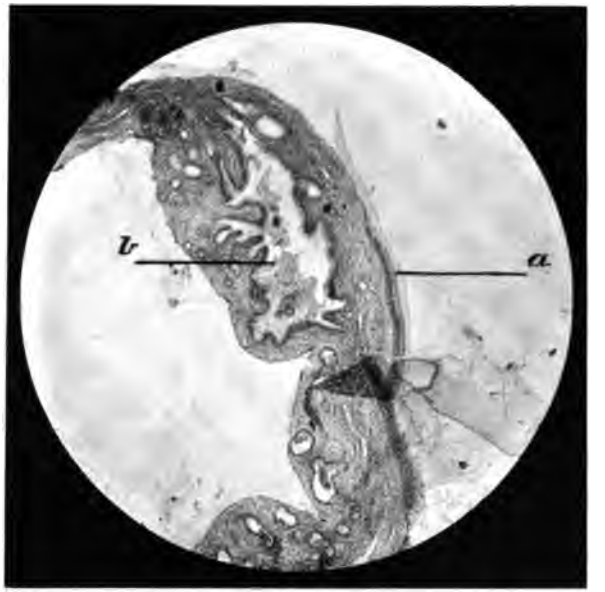


Fig. 18. *Section of the wall of a large dental cyst, showing secondary cysts in its substance.* a. *Epithelial lining of large cyst.* b. *Small cyst.* × 35.

examination. At the operation the antrum was found unaffected; but the whole jaw was excised by Mr. Stanley Boyd, and the patient remains well now, more than a year later.

### III.—GROWTHS ARISING IN THE BONE.

Inflammatory hyperplasia of the lower jaw dependent on the irritation of a buried root is worthy of remark, as a large amount of new bone may be thrown out round a small piece of root, the presence of which is entirely unknown, and much graver disease may be suspected. A stereoscopic X-ray photograph should always be taken. In the upper jaw the tendency to lay down new periosteal bone under such circumstances is remarkably less, though occasionally, perhaps more in young subjects, it is found.

Hyperplasia of the alveolar plates of the jaws (so-called multiple exastosis) is found in cases of chronic pyorrhœa alveolaris. The enlargement begins over the roots of the affected teeth, and may affect either jaw (Fig. 20). Where teeth are absent there is no enlargement, and the palatal or lingual aspect of the alveolus is affected only in the canine and bicuspid region of the lower jaw. Probably the position of the tongue in the mouth accounts for the absence of growth except in this region, as these are precisely the points where the tongue at rest exerts no pressure on the bone. As the hyperplasia enlarges the distinct swellings over the teeth tend to run into each other, and produce the condition shown in Fig. 21. In some cases the overgrowth is limited to one portion of the alveolus, in others it is general; but, in all, the growth limits itself more or less accurately to the alveolar portion, so that no condition resembling acromegaly or diffuse osteoma is produced, but rather a very characteristic shelf-like growth, which juts out from the bone for a distance of perhaps half an inch.

In some cases, especially where septic roots are combined with pyorrhœa, a much more generalised hyperplasia of the alveolar portion takes place, and all distinction of bosses over separate teeth is absent. Still, in these cases the limitation to the alveolus is obvious, and the characteristic shelf-like condition well marked. Fibrous hyperplasia of the muco-

periosteum, as described above, may be found associated with this condition.

The bone in these cases is cancellous, or of a more close and granular appearance; but never hard. After removal of the exciting cause, if the growth be of any size, it shows no tendency to involute, nor to enlarge. In osteoma, or osteo-sarcoma, I have been unable as yet to trace any direct dependence on teeth. Odontomes, including dentigerous cysts, are purposely excluded from this paper.

Though evidence is slow to accumulate and difficult to obtain, enough has, I think, been said to show that both epithelial and connective-tissue tumours—innocent and malignant—may owe their exciting causes to morbid conditions of the teeth. The evidence is especially strong as regards dental cysts and epithelioma; also as to single fibroma and myeloid sarcoma. On *a priori* grounds it is to be expected that other forms of sarcoma will by careful observation be found to have at times a similar origin.

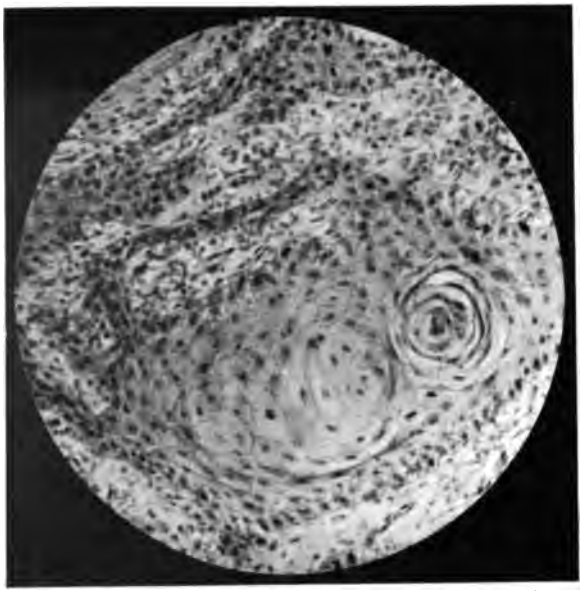

Fig. 19. *Cell-nest from a case of boring epithelioma of the upper jaw, which began in the periodontal membrane of a dead tooth.* × 300.

Fig. 20. *Photograph of a cast of the early stage of bony hyperplasia dependent on pyorrhœa alveolaris, showing the enlargement beginning over the root of each tooth separately. (Upper jaw.)**

Fig. 21. *Photograph of late stage of bony hyperplasia due to pyorrhœa alveolaris, showing coälescence of the bosses, and limitation to the alveolar part of the jaw. (Upper jaw.)**

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# A FURTHER CONTRIBUTION TO THE DISTRIBUTION OF CANCER.[1]

By D'ARCY POWER, F.R.C.S. (Eng.),

*Senior Surgeon to the Victoria Hospital for Children, Chelsea; Assistant Surgeon at St. Bartholomew's Hospital, E.C.*

THE object of post-graduate study is best attained, I think, if each lecturer brings forward some account of the work in which he is especially interested, particularly if such work is of a pioneer character and deals with some of the more important scientific problems of the day. Benefit thus accrues to the lecturer as well as to his audience. The lecturer reviews his facts and theories, because he is obliged to marshal them; he may even be tempted to draw conclusions tentatively; but he is certain to be helped by the suggestions and questions of those who listen to him. The audience, on the other hand, gain some knowledge of what is being done by different workers each in his own field. They have the opportunity, too, of seeing each investigator, and of correcting what he says by the personal equation which is so valuable a factor in judging every piece of original work.

Acting upon this principle I am about to give you an account of some work on the local distribution of cancer which has recently occupied a part of my spare time. Like many other medical men I am interested in the increase of cancer which has undoubtedly taken place within the last fifty years, and I have made many attempts to discover the cause. I thought, at first, that the question might be solved in the laboratory, and I spent much time in examining the various appearances which were put forward so confidently as "cancer-parasites." My distrust of the "parasites" as a cause of cancer increased on more intimate acquaintance, and

[1] A post-graduate lecture delivered at the Medical Graduates' College and Polyclinic, April 7, 1903.

ended in complete disbelief, when I found that many of them could be produced by artificial means in normal epithelium which had been submitted to various forms of irritation.[1] But I have not yet quite lost faith in the infective or parasitic theory of cancer; and as the time at my disposal becomes yearly less, I have been obliged to turn from researches in the laboratory to an examination of other fields, which require a thorough exploration before it can be said that the cause of cancer is beyond our present powers of elucidation.

My attention of late years has been directed more especially to places where deaths from cancer have appeared to be unduly numerous, and the kindness of various friends has brought to my notice several such villages. I am going to give you details of two of these villages, because they appear comparable with each other, and show very well the fallacies, as well as the advantages, of this method of examination. In the one set of cases the increase in cancer is real; in the other set it seems to be only apparent. Yet I may say parenthetically that in neither district would I reside, on any account whatever, unless I knew that my ancestral tree was absolutely free from even a suspicion of cancer.

The details of the first village are shortly as follows[2]:—

The district is a flat country which lies from 60 to 150 feet above the sea-level and consists geologically of gravel overlying boulder-clay. It is well watered, for one small river rises within its confines, and it is traversed by another which rises a few miles away, while it is intersected by many small and unnamed streams. There are several fens in the neighbourhood, and much of the country shows the ordinary characters of marsh-land. The population is scanty, agricultural for the most part, the peasants living in cottages many of which are but moderately comfortable. The bulk of the population live in one or two small villages. There is no marked tendency for the same families to intermarry in different generations, and the younger men and women do not go far afield. Insanity

[1] "Some Effects of Chronic Irritation upon Living Tissues." *The British Medical Journal*, 1893, Vol. II., p. 830; *The Journal of Pathology and Bacteriology*, Vol. III., p. 24, and Vol. IV., p. 69.

[2] A fuller account was published in the "Cancer" number of THE PRACTITIONER (April, 1899, p. 418).

is common, and phthisis is fairly frequent; but cancer is the prevailing disease.

The population of the whole district is just over 12,000, and during the years 1872–1898 173 cases of cancer were under observation, 59 occurring in males and 113 in females; but 3 of these patients were suffering from cancer when they settled in the district. The age-distribution was as follows:—

| | | | |
|---|---|---|---|
| Between | 20–30 | years | 4 cases. |
| „ | 30–40 | „ | 4 „ |
| „ | 40–50 | „ | 7 „ |
| „ | 50–60 | „ | 33 „ |
| „ | 60–70 | „ | 32 „ |
| „ | 70–80 | „ | 37 „ |
| „ | 80–90 | „ | 7 „ |
| „ | 90–100 | „ | 1 case. |

The ages of the remaining patients are not known.

Forty-nine patients had cancer of the alimentary canal; 10 had epithelioma of the lip; 22 had cancer of the liver. The breast was affected in 37 cases and the uterus in 31. The ovary, testis, and bladder were the seat of cancerous disease in 1 case each; the kidney in 2 cases, the bone in 3, and the skin in 5. The exact seat of disease was not specified in 11 cases.

The actual numbers are not very imposing, but the interest centres in the manner in which the cases were distributed. The disease appears to cling to certain spots and groups of buildings, irrespective of their size, and, what is still more suggestive, of their age.

In this district malignant disease has attacked patients in the Hall and the Manor-house as well as in the cottage of the humblest labourer; it has occurred in new buildings of brick as well as in the old thatched homestead. In one village of 1,036 inhabitants, amongst whom 42 cases of malignant disease occurred between the years 1872–1898, I find that 4 houses had more than 1 case of cancer apiece. In 4 cases cancer occurred in adjoining cottages under the same roof, and in 2 cases in houses which adjoined each other, though they had not a common roof. In 7 instances malignant disease occurred

in neighbouring houses separated from each other by such short distances as the width of a street or the length of a field, there being in each case no intervening building. I was careful to enquire whether there was a common well, when two or three houses under the same roof had provided cases of cancer. A single surface-well supplied the cottages in most cases; in others each cottage had its own water-supply. In one case the occupants of a cottage had actually taken the trouble to send some distance for their drinking-water, although there was a well on their premises; yet they, like their neighbours, had suffered from cancer, whilst those who shared the water with them were unaffected.

All ages and both sexes were attacked, though, as is usual, the older people suffered in by far the larger proportion.

A careful examination of the individual cases showed some remarkable sequences. A man, aged 26, whose great-aunt had died of cancer of the breast, lived in a new house on land which had previously been pasture. He died of an epitheliomatous ulcer of the groin. His successor in the house died of cancer of the rectum, and the latter's successor, again, died at the age of 36 from malignant disease of the brain, secondary to a growth in the testis.

In another series of cases there were three cottages under one roof. A married daughter died in one of these cottages in 1892 of a pelvic sarcoma at the age of 22; her mother, who lived in the next cottage, died of cancer of the uterus in 1894 at the age of 52; and in 1898 a man, aged 74, died of cardiac dropsy in the third cottage, who had been operated on some years previously for an epithelioma of the lip.

A man and a woman lived in two new brick houses adjoining each other, each built by the owner and occupier; the woman died of cancer of the uterus at the age of 62, her mother having previously died of the same disease; whilst the man died at the age of 80 of epithelioma beginning in the lip. Both patients died in March, 1874. Two other neighbours, living next door to this man and woman, died within six months of each other—the one a man, aged 69, of an epithelioma of the lip; the other a woman of 80 of an epithelioma of the arm.

The sister-in-law of the clergyman of the parish died of

cancer of the breast. Her maid, who had lived long in the family, died eighteen months afterwards of cancer of the uterus, but she had moved to another part of the village after the death of her mistress. Thirteen years later her next-door neighbour died of a similar complaint.

A man, aged 69, died of cancer of the stomach in 1895; his widow is still alive, but one of her breasts has been amputated for scirrhus.

Some of the sequences of cases in these series are very weak, and in all probability are accidental, whilst others are sufficiently strong to make it worth while to keep under observation the houses where they have occurred.

The incidence of cancer in different generations is well seen in some of the cases, though they are few in number. Two brothers died of cancer of the rectum; the next generation consisted of two sisters, one of whom died of cancer of the breast and the other of the cancer of the tongue. A mother died of cancer of the breast; two of her daughters died of a similar disease, and the third of cancer of the uterus. A father died of cancer of the rectum and the mother of cancer of the uterus and breasts; the daughter has since died of cancer of the breast. In one or two cases the child has had malignant disease before the parent has shown any sign, though it has developed in the latter subsequently.

An unduly large proportion of the cases of cancer occurred near the streams which water the district. They are most numerous, of course, in the little villages through which the streams run, but cases of cancer are not absent from the scattered houses on their banks; whilst, as if to emphasise the connection between the waterways of the district and the distribution of the cases of cancer, one whole series of cases occurred in a hamlet traversed by a small brook arising a mile or two away in a mere. One of the rivers rises in a fen within the district, the other a few miles beyond the area under consideration, but in a similar manner. The fen in which one of the rivers takes its origin is only 86 feet above the sea-level, so that the course of the river is naturally sluggish. It flows, at first, amongst marshes, and afterwards through a well-wooded country. The second river is only

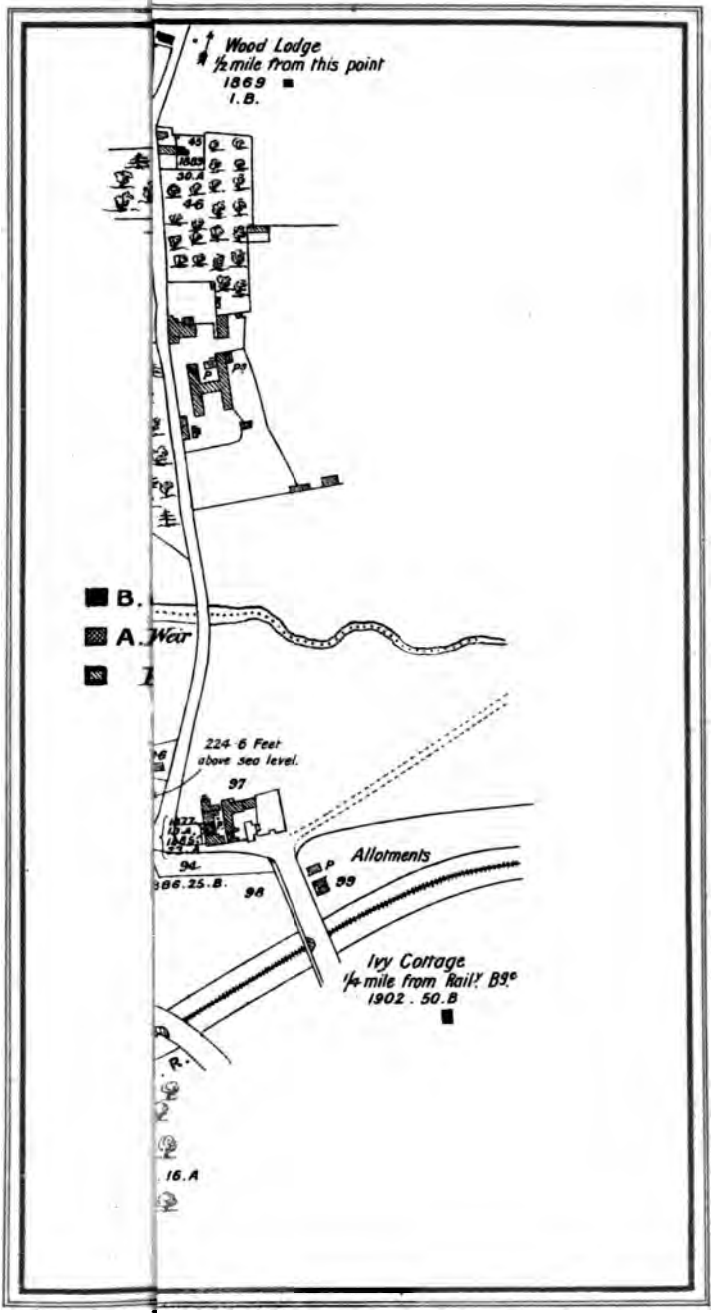
69 feet above the sea-level when it enters the district, and it, too, traverses a marshy and well-wooded country.

It is impossible, I think, to resist the conclusion that the marshy grounds from which the rivers arise in this district, as well as their wooded banks, have some causal connection with the numerous cases of cancer which have been observed in their immediate vicinity. This part of the country must at one time have been preëminently malarious, and thus the inhabitants must have been constantly in a debilitated condition. But improved drainage of the land and a higher standard of living and personal comfort have led to a disappearance of ague, partly by abolishing the particular species of gnat which carried the infecting protozoön, and partly by increasing the resisting-power of the natives. A greater number of people in this area thus reach the age when cancer is common, but they do not reach it in average health; for the conditions under which the agricultural labourer exists are not so favourable as those of the townsmen. He is more exposed to the inclemency of the weather; his hygienic surroundings are often bad, his wages are low, and his cookery is usually beneath contempt. It is well known that the tendency to cancer is increased by irritation of the tissues and by depressing influences of body and mind. It is not improbable therefore that the hypothetical cause of cancer might have increased facilities for its work and growth in such surroundings as those which have just been described.

In April, 1902, I received a letter from Sir William H. Broadbent containing enclosures which led me to take the train to a little village about eighty miles from London. The rector of the parishes received me very kindly, and I have been able with his help to gather the following facts:—

The village (*see* Map [1]) consists of two parishes with a united population, in 1901, of 456 persons. It is situated on the Northampton sands, which consist of ironstone and sandstone, the equivalent of the Stonesfield slate, says the *Geological Survey of England*, and just beyond the village is a bed of

[1] The numbers and dates on the map correspond with those in Table A.


Wood Lodge
½ mile from this point
1869
I.B.
B.
A.
Weir
224·6 Feet
above sea level.
97
Allotments
99
94
98
Ivy Cottage
¼ mile from Rail.y Bge
1902 . 50.B
R.
16.A

upper lias clay. A stream divides the parishes, and in so doing separates the village into two parts, which are fairly equal in point of size and in number of inhabitants. The stream is marked on the Ordnance Survey map as being 203 feet above the sea-level, the houses on the right side being 260 feet, and those on the left side 230 feet, above the sea-level. The stream thus lies 30 to 60 feet below the banks upon which the houses are built, but none of them are situated very close to the water. The stream is little more than a sluggishly-flowing brook which opens into the River Nen about a mile and a half away. It was dammed up some time ago at the point where it passes through the village, and the village drains empty themselves into this portion. One drain became such a nuisance that it has been diverted quite recently to open a few yards below the dam. The water in the lake is opaque and stagnant (it has been stocked with fish two or three times, but they always die). The dammed-up piece of water is about half a mile in length, and it floods the surrounding meadows every two or three years.

The surrounding country is well wooded, and the whole village swarms with gnats, flies, and mosquitoes. Both parts of the village are in a highly insanitary condition. There is hardly any attempt at drainage, and the drains are so ill cared for that (when I saw the village) liquid sewage was oozing through the soil at one or two places and trickling over the road. Most of the villagers keep pigs, and the water-supply is obtained from surface-wells, the contents of which are greatly polluted, the water containing numerous animalcules. The children all look thin and anæmic, and the whole population is constantly ailing, diphtheritic sore-throats, recurrent bad colds, poisoned wounds, and boils being of frequent occurrence; whilst people who come fresh to the village (such as shop-assistants, domestic servants, and newly-married women) go through a most painful process of acclimatisation before they become immune to their unhealthy surroundings.

The following deaths from phthisis and cancer have taken place in this small population of 456 persons from 1869-1902:—

TABLE A.

| | A.—Phthisis. | | | B.—Cancer. | | |
|---|---|---|---|---|---|---|
| 1 | 1869 | None. | — | Female - | 46 | Breast. |
| 2 | — | — | — | — | — | — |
| 3 | 1870 | Male - | 21 | None. | — | — |
| 4 | — | Male - | 20 | — | — | — |
| 5 | 1871 | None. | — | None. | — | — |
| 6 | 1872 | None. | — | None. | — | — |
| 7 | 1873 | None. | — | None. | — | — |
| 8 | 1874 | Male - | 70 | None. | — | — |
| 9 | — | Male - | 19 | — | — | — |
| 10 | 1875 | None. | — | None. | — | — |
| 11 | 1876 | None. | — | None. | — | — |
| 12 | 1877 | Female - | 23 | Male - | 78 | Penis. |
| 13 | — | Male - | 23 | — | — | — |
| 14 | 1878 | None. | — | None. | — | — |
| 15 | 1879 | None. | — | None | — | — |
| 16 | 1880 | Female - | 16 | Female - | 58 | Breast. |
| 17 | 1881 | Male - | 25 | None. | — | — |
| 18 | 1882 | None. | — | None. | — | — |
| 19 | 1883 | None. | — | Female - | 36 | Stomach. |
| 20 | 1884 | Male - | 63 | Female - | 69 | Uterus. |
| 21 | 1885 | Female - | 25 | Male - | 38 | Rectum. |
| 22 | — | Female - | 48 | Male - | 62 | Stomach. |
| 23 | — | Male - | 28 | — | — | — |
| 24 | — | Female - | 20 | — | — | — |
| 25 | 1886 | None. | — | Female - | 60 | Breast. |
| 26 | — | None. | — | Female - | 46 | Sarcoma of breast. |
| 27 | 1887 | None. | — | None. | — | — |
| 28 | 1888 | Female - | 41 | None. | — | — |
| 29 | 1889 | Male - | 32 | None. | — | — |
| 30 | — | Female - | 25 | — | — | — |
| 31 | 1890 | Male - | 27 | Male - | 56 | Stomach. |
| 32 | — | Male - | 11 | — | — | — |
| 33 | — | Male - | 38 | — | — | — |
| 34 | 1891 | Female - | 19 | None. | — | — |
| 35 | 1892 | None. | — | None. | — | — |
| 36 | 1893 | Male - | 14 | None. | — | — |
| 37 | — | Male - | 40 | — | — | — |
| 38 | 1894 | Male - | 49 | None. | — | — |
| 39 | 1895 | Female - | 9 | None. | — | — |
| 40 | — | Male | 39 | — | — | — |
| 41 | 1896 | None. | — | Male - | 25 | Rectum and penis. |
| 42 | 1897 | Male - | 37 | Female - | ? | ? |
| 43 | 1898 | None. | — | None. | — | — |
| 44 | 1899 | None. | — | None. | — | — |
| 45 | 1900 | Male - | 32 | None. | — | — |
| 46 | 1901 | None. | — | None. | — | — |
| 47 | 1902 | None. | — | Female - | 53 | Breast. |
| 48 | — | — | — | Female - | 40 | Vulva. |
| 49 | — | — | — | Male - | 47 | Rectum. |
| 50 | — | — | — | Male - | 52 | Rectum. |
| 51 | — | — | — | Male - | 78 | Lip. |

There remain in the village an unmarried woman with cancer of the breast, aged 42, and a married woman of 60 with cancer of the face.

45 A only lived in the parish two years; 50 B, a native of the parish, died just beyond the boundary.

The Tables A and B show that since 1869 there have been 264 deaths in the two parishes of which the village consists. Of these deaths 44 have been caused by cancer and phthisis, 17 being due to cancer and 27 to phthisis. Of these two diseases, therefore, phthisis was the preponderating cause of death until 1902, but in this year there were seven cases of cancer in this small population, and by the end of the year five of the seven patients had died. Of the total number of 17 cases of malignant disease, 9 occurred in women and 8 in men. These numbers show that the deaths from cancer have been more numerous than they should have been in this village. Dr. J. F. W. Tatham, the Superintendent of Statistics at the General Register Office, states[1] that the cancer-mortality per million persons living in the decennium 1891–1900 was 597 males and 903 females, and that it was rather less in the previous decade. The recently issued[2] special Report on Cancer in Ireland shows that during the year 1901 cancer was the cause of death in 6·5 cases per 10,000 of the estimated population, the proportion of males to females being 45 to 55 per cent. But if the cancer-rate in this village had been equalled in other parts of the kingdom, the mortality would have been nearly 20,000 for females and almost 18,000 for males; or, putting it conversely, if the ordinary cancer-rate throughout the kingdom had been applied to this village there should only have been one death in seventeen years.

An examination of the table shows that the men in the village have been as often affected with cancer as the women, which is quite unusual; for men should only be affected in the proportion of five or six men to nine women, owing to the frequency with which the breast and the organs of generation become cancerous in women.

The women in the village have died, as is usual, from cancer of the breast (seven cases), from cancer of the uterus (one case), cancer of the vulva (one case), and only one case from cancer of the stomach. The men, on the other hand, have died from cancer of the stomach (two cases), and from cancer

[1] *The Clinical Journal*, May 14, 1902, p. 58.

[2] *The Times*, April 6, 1903.

of the rectum (four cases). Only one man has died of cancer of the lip, and one from cancer of the penis. The tongue, œsophagus, and liver have escaped, though cancer in men is common in all these situations.

I have examined the relationships of the various patients who have died of cancer and phthisis with the following results :—

*Cancer.*

(i) A man, aged 78, died of cancer of the penis in 1877, his son having died of phthisis at the age of 20 in 1870.

(ii) A man of 62 died of cancer of the stomach in 1885, his daughter at the age of 42 is suffering from cancer of the breast in 1903.

(iii) A man died of phthisis at the age of 31 in 1870, one of his brothers died of phthisis at the age of 37 in 1897, and another brother died of cancer of the rectum at the age of 52 in 1902.

*Phthisis.*

(*a*) A man, aged 21, died of phthisis in 1870, one nephew died of consumption at the age of 37 in 1897, and another at the age of 52 from cancer of the rectum in 1902 (this is the family mentioned above as No. iii in the cancer list).

(*b*) A man died of phthisis in 1877 at the age of 23, his nephew died of consumption in 1890 at the age of 11 years.

(*c*) A son died of phthisis at the age of 25 in 1881, his father died of phthisis in 1884 at the age of 63, and another son of the same disease in 1893 at the age of 40.

(*d*) A woman died at the age of 48 in 1885, her son at the age of 14 in 1893, both of phthisis.

(*e*) A woman died of phthisis at the age of 41 in 1888, her sister at the age of 19 in the year 1891.

(*f*) A man died at the age of 49 in 1894, and his niece at the age of 9 in 1895.

It is clear, therefore, that the family history shows a stronger predisposition to the disease in phthisis than it does in cancer, and it is further clear that members of the same family may die of cancer and of phthisis.

An inspection of the accompanying map proves that I have

been at some pains to ascertain the local incidence of cancer and phthisis in different parts of the village, for the houses in which cases have occurred are marked and numbered in accordance with Table A., and in each case the date of the patient's death is noted. The map shows that eleven cases of cancer occurred on the left or lower side of the village, and seven in the right or upper part. Patients have died of cancer in many contiguous houses, but only after long intervals of time, and only in one case have two deaths from malignant disease occurred in the same house, and even these are doubtful.[1] There are consequently no houses with a local reputation for cancer such as I described in the previous case (page 700). Two deaths from cancer took place in comparatively outlying parts of the village, but, as might be expected, the majority occurred where the population was most dense.

I have already drawn attention to the fact that the whole village is infested with gnats and flies. I asked my friends to catch me different varieties, and to pickle them at once in Foa's solution (Müller's fluid saturated with corrosive sublimate). I then completed the hardening in alcohol, and had careful microscopical sections made through their heads and abdomens. These sections I afterwards submitted to rigorous microscopical examination under a one-twelfth oil-immersion lens, but in no case did I find any appearance with which pathologists are unfamiliar, or which could not be accounted for by the ordinary changes occurring in growing or decadent tissues, viz., vacuolation, colloid degeneration, and hyaline change. Some of these changes in the tissues of flies obtained from another part of the country are described at greater length, and are figured by me in *The Edinburgh Medical Journal* for July, 1902.

There is a local impression that the increase of cancer is due to the impurity of the water drunk in this village, and my friends' minds have been so greatly exercised upon the subject that they have taken especial notice of the water-supply in no less than 19 houses where cancer occurred. In 10 of these cases it was condemned, after analysis, as unfit

[1] These were a man who died from cancer of the penis in 1877, and a man who is said to have died at the age of 25 from cancer of the rectum and penis in 1896.

for drinking purposes; it was reported as bad, after analysis, in three cases, and it was considered to be bad, but without analysis, in two cases. There was no evidence as to its condition in three cases, and in one case the patient had lived in too many parts of the village to ascertain what had been her usual supply of drinking-water.

The bad water-supply may act as a contributory factor toward the apparent increase of cancer in this village by lowering the vitality or resisting-power of the inhabitants, but it cannot, I think, be looked upon as the main cause. Indeed, many of the inhabitants are beer-drinkers: there are three public-houses to supply this little population of 456 persons, and there is a local brewery. The brewery, it is true, obtains its water from a shallow well, but the process of brewing undoubtedly sterilises the water before it reaches the consumer in the form of beer. The inhabitants, however, are sober, law-abiding, and moral, for the younger generation are in great request as grooms, gardeners, and domestic servants in various large establishments in different parts of the country.

There are many ways of investigating the cause of cancer, and as no one is better aware than myself of the fallacies attending the method here adopted, I have thought it right to bring these two villages under your notice. I believe that the increase of cancer in the first village is a real increase, but that in the second village the increase is only apparent, in spite of the large number of cases which have occurred in the small population. Chief amongst the fallacies in the second case is the smallness of the numbers dealt with, because it gives a wholly disproportionate value to a few additional cases which may occur, and in all probability have occurred, quite accidentally in the village under consideration. The deaths from cancer were comparatively few and far between until the year 1902, when five of the inhabitants, whose ages varied between 40 and 78, died of malignant disease. There appears to have been no undoubted death from cancer in the village between 1890 and 1902 (p. 704, though a man, aged 25, is said to have died of malignant disease in 1896—the return says "of cancer of the penis and rectum," which may have been a sarcoma, or perhaps only a tubercular

ulceration extending from the prostate. A woman is also said to have died of cancer in 1897, but she died away from home, and no details are forthcoming about her.

The five deaths in 1902 suddenly brought up the average, and the rapid sequence naturally caused some alarm in a small community where everyone is known. It is probable, however, that when the two persons have died who are now affected with cancer, there will be no more deaths in this locality for many years to come. The mortality of the village, too, is not quite comparable with that of a town, nor even with that of the surrounding parts of the country. It is practically, as the following Table B (p. 710) shows, a mortality of children and old people with a few weaklings of youth and middle age, since the majority of the younger people, as I have said, go out to service far away from home, even in preference to seeking work in a large manufacturing town only four miles distant, where many thousands of hands are employed in a sedentary trade.

But if fallacies beset the method of investigation here adopted, there is no doubt that certain advantages attend it, because it affords information which is unattainable in any other way. The smallness of the numbers and the compactness of the area enable many facts to be gathered easily and accurately by a single observer, for the family history of the patients is well known, their habits are known—perhaps only too well for the individual's peace of mind in so small a community—and their surroundings are also well known. The people in this village have lived very much as they have always lived and as their fathers have lived before them. Their habits have undergone no violent alteration, and the average duration of their lives does not seem to be increasing. The additional purchasing-power of their wages has undoubtedly added to the comfort of the present generation by allowing them to be better shod, and to go more warmly clothed, as well as by giving them a greater variety of food. Their standard of cooking, on the other hand, has not been raised; and they probably eat less food than did their fathers, but it is of better quality.

Another advantage of an investigation in a small community is that it enables the family history of the patients attacked

TABLE B.

Deaths from all causes, and at the ages mentioned.

| — | Parish A. | Parish B. | Total. |
|---|---|---|---|
| 1869 | 82, 3, 7 weeks, ?, 70 - - | 57, 46, 3, 72, ? - - | 10 |
| 1870 | 72, 72, 5, ?, 55 - - | 17, 10, 59 - - | 8 |
| 1871 | 63, 65, 20, 50, 8 months, 81, 11, 30, 2, 1 year. | 49, 86, 66, 69 - - | 14 |
| 1872 | 54, 65, 68, 13 days, 56, 14 months. | 18 months, 74, 75 - | 9 |
| 1873 | 56, 66, 19, 74, 63, 47 mths., 5 mths. | 76, 70 - - - | 9 |
| 1874 | 4, 19 months, 4, 30, 70, 19, 20 months. | 26, 71, 79, 82 - - | 11 |
| 1875 | 3 months, 65, 5 weeks, 59, 10 months, 63, 60, 3 months, 1 year. | 72 - - - | 10 |
| 1876 | 59, 77, 2, 42, 42, 69 - - | — | 6 |
| 1877 | 74, 70, 23, 74, 23 - - | 78 - - - | 6 |
| 1878 | 40, 8 months - - - | 42 - - - | 3 |
| 1879 | 75, 50, 33, 4, 40, 35, 6 months, 7 months, 67. | 74, 77, 69, 73 - - | 13 |
| 1880 | 76, 60, 7, 16, 66, 8 months, 31 months. | 52, 85 - - - | 9 |
| 1881 | 25, 74, 19 months, 10 months | 81 - - - | 5 |
| 1882 | 11, 35, 5, 49, 67, 71 - - | 81, 9 months, 79 - | 9 |
| 1883 | 36, 76, 58, 4, 75, 10, 17 - | 64, 16, 64 - - | 10 |
| 1884 | 61, 74, 14 days, 2, 71, 11 months, 63, 9 months, 23 months, 60, 69, 77. | 89, 69 - - - | 14 |
| 1885 | 25, 38, 48, 8 months, 3, 28, 74, 76, 20, 18 months, 88, 5 weeks, 2½. | 62 - - - | 14 |
| 1886 | 24, 17 months, 79, 46 - | 18 days - - - | 5 |
| 1887 | 10 days, 4 months - - | 84, 2 months - - | 4 |
| 1888 | 24, 41, 77, 31, 31 months, 35 months, 59, 14 weeks. | 37 - - - | 9 |
| 1889 | 23 months, 14 days - - | 32, 82, 86, 25 - - | 6 |
| 1890 | 10 months, 27, 11, 71, 69 - | 57, 38 - - - | 7 |
| 1891 | 19, 7 months - - - | — | 2 |
| 1892 | 12, 72, 56, 11 - - | 27 - - - | 5 |
| 1893 | 21 months, 77, 14, 78, 40, 85, 79. | 49, 49, 38 - - | 10 |
| 1894 | 67 - - - - | 79, 49 - - - | 3 |
| 1895 | 9, 10, 9 - - - | 75, 33, 39, 56 - - | 7 |
| 1896 | 6 months, 80, 15 months, 59, 65, 64. | 25, 74, 80, 3, 65 - - | 11 |
| 1897 | 14 months, 64, 42 - - | 80, 78, 62, 37, 84 - | 8 |
| 1898 | 1 month, 47 - - - | 9 months, 88 - - | 4 |
| 1899 | 87, 79, 82, 90, 65, 44, 6 months | — | 7 |
| 1900 | 61, 79, 35, 32, 28 days - | 65 - - - | 6 |
| 1901 | 73, 21 months - - | — | 2 |
| 1902 | 81, 47, 53, 21, 78 - - | 40, 45, 86 - - | 8 |
| | | | 264 |

to be easily elucidated, and the heredity of cancer is still a matter of some dispute. There is widespread belief that

cancer is hereditary, but the term heredity is so elastic that people use it in very different senses. Cohnheim and the pathologists of his school affirm that the offspring of cancerous parents are born with such epiblastic peculiarities that a very slight stimulus is sufficient at the appropriate time to produce the diseased activity of the epithelium which is cancer. I believe that such a statement is far too absolute and is usually incorrect. It is more likely that a person is born with a predisposition to the disease, though there is every reason to suppose that such a predisposition may be acquired. The predisposition consists perhaps in some chemical change in the tissues, enabling them to support the life and growth of an organism, which in turn reacts upon the epithelial cells and makes them multiply out of all due proportion. If cancer is truly hereditary in Cohnheim's sense, the various members of a cancerous stock should suffer from the disease whether they remain at home or scatter themselves abroad. The time at which they are attacked should vary with the vitality of the individual tissues in each person, for cancer is essentially a disease of decadent epithelium. Every member of the family, however, should not suffer, because every child does not inherit the epiblastic peculiarity which, on Cohnheim's theory, is a necessary factor in the production of cancer.

Many observers and statisticians have devoted themselves to a consideration of the heredity of cancer, and their conclusions do not lend support to Cohnheim's view. Mr. Butlin teaches that heredity influences cancer, but that the relationship in the cases he has examined were almost invariably on one side, and there were scarcely any cases in which the history of cancer was divided between the families of both parents. Mr. Roger Williams[1] has analysed the records of the family history of more than 700 patients affected with innocent and malignant tumours, in order to ascertain the frequency with which there was a history of heredity. He found that there was a history of heredity in 28 out of 124 cases of uterine cancer, which is equal to a proportion of 19·7 per cent. In 136 cases of mammary cancer there was an hereditary history of cancer in 33 cases, which gives an average of 24·2 per cent. Of 92 other female

[1] *Twentieth Century Practice of Medicine*, Vol. XVII., p. 264.

cancer-cases there was a history of heredity in 22 or 23·9 per cent. Thus of the 370 females suffering from cancer there was a history of heredity in 83 or 22·4 per cent. Of 209 men suffering from cancer there was a history of heredity in only 23 or 11 per cent.—a difference which Mr. Roger Williams attributes to the fact that men know much less than women about the details of their family history. In 345 cases of malignant disease occurring in women there was a family history of innocent tumours in 13 or 3·7 per cent., whilst in 101 cases of non-malignant tumours in women there was a family history of cancer in 18 or 17·8 per cent., and in these same 101 women there was a family history of cancer in 15 per cent. The history of heredity, therefore, is not a very strong one in many cases, and appears to indicate little more than a predisposition to the disease.

A study of the predisposing causes of cancer seems at the present time to afford better prospects of elucidating the cancer-problem than the statistical examination of its hereditary incidence. The more I see of cancer cases, the more I am struck with the frequency with which a widow or widower dies of malignant disease, when the husband or wife has previously died of cancer. I think, at present, that these cases are more than mere coincidences, and that they may point to some common factor in the joint lives of the sufferers which has allowed their decadent epithelial cells or connective tissue to run riot. This factor may be predisposing, as is the more likely, in which case it might be of a chemical nature, associated with modern alterations in diet and habits; or it might be an exciting cause such as a parasite or other infective agent.

I have already said that I do not believe cancer to be hereditary in the sense that all, or even some of, the children of parents who have died of malignant disease are themselves predestined to die of cancer, but I feel sure that under appropriate conditions they are more likely to do so than those who have not inherited any such proclivity. I believe, in other words, that some tissues are more fitted than others to develop cancer under the influence of an exciting cause as yet unknown, just as syphilis, phthisis, typhus and scarlet fever run a much more malignant course in some people than in others. It

must be borne in mind, on the other hand, that a very remarkable series of cases of cancer may occur in families which have no hereditary history of cancer. Everyone who has worked much at cancer has met with such families, and here is a case in point. A lady, unmarried and aged 61, came to me lately on account of an inflammatory swelling in her knee, and in the course of conversation she mentioned that her breast had been amputated for cancer five years ago. On enquiry she said that her mother was alive and was over 90. Her father, a gentleman and a Londoner, had lived in his own house at Islington, where he had died just before she was born. The family consisted of seven children, the last being twins. The eldest brother died of cancer of the liver at the age of 58, and the eldest sister died in childbed at 40; Ellen, the next sister, died at 58 of cancer of the breast; Fanny at 30 of a tumour of the brain. This sister was married at 16, lived at Cheltenham, and had a healthy son, who is alive at the present time. She had no miscarriages, so far as is known, and the cerebral tumour is therefore more likely to have been tubercular or sarcomatous than a gumma. Clara, a twin sister, died at 52; her breast had been amputated for cancer, and five years later she had cancer of the liver. Her twin brother Edward died at 58½ from a recurrent tumour of his knee. All the brothers and sisters, with the exception of Fanny, had lived together in the old home, as it was only by uniting their incomes that they could afford to maintain it. No history of malignant disease could be traced in the ancestors or collaterals of this family, though the old mother must often have enquired anxiously as one after another of her children was taken away. It is obvious that both sarcoma and carcinoma were present in this family, or, in other words, that the connective tissues were as liable to disease as was the epithelium.

Such a family seems to show that the predisposition to cancer may be acquired, and the village about which I have told you bears out this assumption. It would be very interesting to ascertain whether the predisposition to cancer is being now developed, and if so, under what agencies, even if we remain in ignorance for a time of the actual cause of the disease. There is no marked heredity in the history of the little community under consideration; the evidence, indeed,

rather leads to the conclusion that the disease is not hereditary here, for only in one family have the two children (both females) suffered from cancer, and no cancer has appeared in the collateral lines even of this family. But the cancer in this community has only attracted attention within the last few years, and it will be a matter of extreme importance in the future, and yet of comparative ease for those who live on the spot, to watch the descendants of these men and women through one or two generations and note the diseases of which they successively die. This my friends have undertaken to do so far as lies in their power.

I have endeavoured in this lecture to describe the advantages, and point out some of the fallacies, which attend any investigation of cancer by watching the disease in small communities which are practically free from external influences. The method is necessarily a long one, and it is only by noting the facts as carefully as possible that any advance can be made. It may, indeed, take a generation or two to establish the facts, but with maps of sufficient scale, accurately marked and kept up to date, there should be no very great difficulty in carrying the enquiry to a successful issue. I have already said that I believe the increase in cancer is real in the first district; largely fictitious—in the sense that it is accidental—in the second village. But in both villages the inhabitants are hardly up to the average standard of health, and it will be very interesting to observe whether the increase in the number of cancer-cases continues so long as the inhabitants of the second village are condemned to drink bad water, and whether, when a good water-supply is provided for them, the cancer-mortality falls to the normal rate. Should this occur there will be some grounds for believing that a prolonged lowering of the bodily health may predispose the agricultural classes to malignant disease, just as we know that amongst the upper classes grief and worry act as predisposing causes of cancer.

# Reviews of Books.

*A Text-book of Diseases of the Ear, for Students and Practitioners.* By Professor Dr. ADAM POLITZER. Translated at the personal request of the Author and edited by MILTON J. BALLIN, Ph.B., M.D., and CLARENCE L. HELLER, M.D. Fourth Edition, revised and enlarged. With 346 original illustrations. London: Baillière, Tindall, and Cox. 1902. Price 25s.

THE appearance of the fourth edition of Professor Politzer's well-known work upon diseases of the ear will be welcomed by all English-speaking students of otology, as well as by many practitioners of medicine anxious to gain a knowledge of the pathology and treatment of aural diseases. It is not too much to say that the book is a veritable storehouse of information, and will add still further lustre to the name of its gifted author. The general plan of the present edition is little altered from that of its predecessors. Several chapters have, however, been remodelled, and some new chapters have been added so as to bring the book into line with our present knowledge. The bibliography appended to various chapters and the "Index of Literature," will be found of great value for purposes of reference while the appendix containing the formulæ of prescriptions commonly in use at the Viennese Clinic will no doubt prove of much practical service.

The sections devoted to the surgical treatment of chronic suppurative middle-ear disease and its complications are thoroughly up to date. The development of the radical mastoid operation is fully worked out, and the methods of laying bare the accessory cavities of the middle ear are carefully described and illustrated. The various plastic methods in use for healing up the exposed cavities receive due consideration, the "grafting" method of Charles A. Ballance being mentioned in some detail, although the author remarks that up to the present he has not employed it. He argues

that upon anatomical grounds it is applicable only in cases in which from aural examination and clinical symptoms the possibility of primary union may be expected before the operation.

The section devoted to the description of Oto-sclerosis or capsulitis labyrinthi, formerly described as dry middle-ear catarrh, will be read with great interest by all otologists. The author's views upon the pathology and treatment of this condition demand great respect, and will probably be accepted by all who have much experience of this painfully-common and intractable form of ear-disease.

Any attempt at a detailed criticism of this monumental work seems out of place. The fact of its having been written by such a master hand is of itself a guarantee of excellence, thoroughness and accuracy. To the translators our thanks and congratulations are due. As Professor Politzer himself says in his letter to the Translators, the book "does not read like a translation, but more like an original work." Drs. Ballin and Heller have been faithful and "voluntary" assistants in Professor Politzer's Clinic during the past two years. Translated thus under the walls of the Allgemeine Krankenhaus and supervised by the author himself, the book will not only appeal to the reader on account of its intrinsic worth, but to many it will recall pleasant and profitable days spent in acquiring a knowledge of aural surgery in this world-renowned Clinic. The publishers have done their part as was to be expected of this well-known firm.

*The Diseases of Hot Climates.* By Dr. B. SCHEUBE, State Physician and Sanitary Adviser, Greiz. Translated from the German by PAULINE FALCKE. Edited by JAMES CANTLIE, M.A., M.B., F.R.C.S., D.P.H., Lecturer at the London School of Tropical Medicine. Pp. 594, with 19 plates, 58 figures and 5 maps. London: John Bale, Sons, and Daniellson. 1903. Price 30s. nett.

EDITOR, translator, and publishers are alike to be congratulated upon this excellent English reproduction of Professor Scheube's great work. Everywhere the book seems well up to date; in fact the only omission which we have noted is that of any reference to Wright's cultivation of a fungoid organism from the

black variety of Madura disease. Every affection is as far as possible dealt with upon a definite scheme, comprising not only its symptomatology and treatment, but also its history, geographical distribution, pathology, and prophylaxis, and concluding with a copious bibliography. The excellent illustrations and maps add greatly to the value of the book.

*Transactions of the Society of Anæsthetists.* Vol. V. London: 1903.

THE fifth volume of the Transactions of the Society of Anæsthetists bears testimony to a flourishing condition on the part of the Society and to the excellent quality of the papers read at its meetings. Perhaps the most important of those contained in the present volume is from the hand, not of a practical anæsthetist, but of a physiologist, Dr. E. H. Embley. His communication on "The Causation of Sudden Death during the administration of Chloroform" supplies substantial confirmation of the views on vagus-inhibition, vasomotor paralysis and the direct action of chloroform upon cardiac muscle which are now generally accepted. Certainly the opponents of those views failed to make their case good in the discussion which followed the paper. This exchange of opinions, in which, among others, Sir Victor Horsley, Sir T. Lauder Brunton, and Colonel E. Lawrie took part, affords interesting reading. Papers of a practical nature were contributed by Messrs. E. R. Corner and H. C. Crouch on examination of deaths from respiratory trouble after ether, and by Dr. J. Blumfeld on "Complete Relaxation of the Abdominal Walls during Anæsthesia." Various cases of unusual nature and records of fatalities under anæsthetics are to be found among the discussions.

*Points of Practical Interest in Gynæcology.* BY H. MACNAUGHTON JONES, M.D., M.Ch., Q.U.I. London: Baillière, Tindall, and Cox. 1902. Price 4s. 6d.

THE third edition of this attractive-looking book, with its good paper, print and drawings, was published at the end of last year. We regret that we find the form of the volume more commendable for the most part than its matter. The writer is well known to occupy the somewhat anomalous position of a

specialist in more than one subject; and this fact will explain statements in this book which would otherwise be incongruous. For example, on page 4 we read: "I have had no single case of post-operative insanity arising directly from an anæsthetic in abdominal or pelvic surgery, as I have had in ophthalmic;" and on page 35 reference is made to the author's treatment of a "bad compound luxation wound of the ankle joint received from a reaping machine." Such statements can scarcely be said to afford even sidelights on the nominal subject of the book—gynæcology. In the matter of the volume a good many points seem open to criticism. Thus it is difficult to see the *rationale* of some of the operative procedures; *e.g.*, a primary malignant growth was removed (page 62) from the right ovary after it had been decided that large carcinomatous masses in the omentum were too far advanced for removal: the satisfaction gained was that "the course of her convalescence (*sic*) was uninterrupted." On the other hand we are glad to see that the operation of clitoridectomy is not advocated. Under the heading of Neuroses of Ovulation we meet with a curious medley of functional and organic diseases, such as "locomotor troubles," "ocular troubles," "aphonia," "tinnitus aurium with middle ear and labyrinthine complications," &c. Chapter VI. deals with the indications for the operations of hysterectomy and myo-hysterectomy. Here we find the author recording a case (page 136), in which he takes credit for having scored over an "eminent gynæcologist," by removing a necrotic fibroid, which procedure the latter had not deemed a matter of necessity. Nor is this an isolated instance of this form of passing comment. Again, we are in absolute accord with Mr. Alban Doran, whom the author quotes on another page—presumably in order to emphasise the great gulf which is fixed between the two schools of gynæcologists of the present day—to the effect that "most fibroids require no operative treatment whatever." Dr. Macnaughton Jones is of the contrary opinion. It is surprising that so practised a writer should have paid so little attention to the revision of proof-sheets as he here appears to have done. Amongst the more obvious slips we find (page 12), a paragraph ending with the words "the final toilet and dressing of the womb"; and again (page 30), we are told: "formalin vapour I avail of (*sic*) in the larger Alformant lamps

for my operating room," &c. In the history of cases, too, dates are loosely dealt with: thus (page 49) we are suddenly told, that "on the 26th, she (the patient) was in much the same state," no previous or subsequent date being given. This appears to leave unduly much to the reader's imagination.

*A Treatise on Pharmacy for Students and Pharmacists.* By CHARLES CASPARI, Jun., Ph.G., Professor of Pharmacy in the Maryland College of Pharmacy. Second Edition. Pp. xiii. and 776. Illustrated with 301 woodcuts and a portrait-plate. London: Henry Kimpton. 1902. Price 19s. net.

THE need for a second edition of this work has afforded the author an opportunity of adding two new chapters on prescriptions and the assay of alkaloidal drugs. Several chapters have been largely rewritten and considerable additional matter has been incorporated with others. Although primarily intended for pharmacists and pharmaceutical students, this book contains a considerable amount of matter which is of interest to the physician. It is divided into three parts, of which the first treats of general pharmacy, comprising metrology, the classification of drugs and a description of the apparatus and operations for the manufacture of Galenical preparations. The second part deals with practical pharmacy, including the making of extemporaneous and Galenical medicines. Pharmaceutical chemistry occupies the third part. In addition to the inorganic and organic chemical remedies it comprises starches, gums, sugars, fats and fixed oils, volatile oils and resins, neutral principles and glucosides, alkaloids, and animal ferments. The author has succeeded in making his treatise a very useful text-book for the student and to some extent a book of reference for the practising pharmacist; but it is by no means entitled to the position which its appearance and its table of contents appear to claim for it. This is particularly the case as far as this country is concerned, because, notwithstanding that it bears the imprint of a London publisher, the British Pharmacopœia is almost entirely ignored; and such scanty references as are made to it are often strangely erroneous. The formulæ of the British Pharmacopœia for

*Liquor Bismuthi* and *Unguentum Zinci Oleatis* referred to are those of the 1885 edition and not those which are now official. Scattered throughout the volume there is to be found a great deal of useful miscellaneous information, which is not usually found in books of this class; for instance, we are told that "red precipitate" is never obtained by precipitation; that potassium bichromate is more properly potassium dichromate; that crystals of zinc sulphocarbolate are of a reddish colour unless the solution has been acidulated with sulphuric acid. Such remarks as the foregoing exhibit the practical teacher who has impressed upon this work his own character. If the numerous illustrations, which are of doubtful utility, were removed, and the space thus gained were devoted to a more extended exposition of general pharmacy and to the inclusion of the preparations of the British Pharmacopœia, Professor Caspari's treatise would be the standard work on this subject. There are a few blemishes which may easily be removed in a future edition. The solubilities of salts should be stated definitely within limits suitable for dispensing at ordinary temperatures. Extract of malt would be more appropriately treated under the heading of "carbohydrates" than under "alcohol." We do not think there is any species of cinchona from which 32 alkaloids can be extracted. Probably the author wishes to imply that from all the known plants of the cinchona genus this number has been obtained. Several important articles have escaped attention, and among these are Ichthyol, Thyroid, and Soxhlet's extraction-apparatus A survey of the whole work convinces us that it is a book of reference of more than ordinary value to the pharmacist, and a desirable acquisition for the physician.

## Notes by the Way.

**The Theories of Cancer.**

In spite of the great amount of attention that has been paid to the subject of the causation of malignant disease in recent times, the cause of the malady is still shrouded in absolute mystery. Great hopes were at first built on the theory that some form of parasite might be found to be the maleficent agent at work, but at present we seem as far as ever from the discovery of such an organism. In the days when bacteria were a novelty, and disease after disease was found to be associated with these minute fungi, several kinds of microbe were successively hailed as the germs of cancer, but each in turn proved to be only a casual inhabitant of malignant growths. Later on the charge was brought against the protozoa that they were the authors of the malady, but it is now recognised that most, at least, of the appearances described as psorosperms are in reality products of the degeneration of epithelial cells and in no sense parasitic. Finally, the yeast-fungi have been claimed as the true excitants of cancer, but these again are probably only accidentally present in the tumours.

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**Contrast between Infection and Tumour-formation.**

It may well be asked whether the evidence which we possess in reality points to an infective cause of either simple or malignant growth. At first sight there is a somewhat striking resemblance between the conditions existing in cases of disseminated malignant disease and in those of tuberculosis and others of the "infective granulomata"; but the analogy is only superficial. In the recognised infections the parasite is carried from one part of the body to another, and in each place in which it settles it excites a proliferation of the cells of the connective tissue already present there, forming a mass of "granulation-tissue." In the secondary growths which occur in cases of cancer, we find, on the other hand, that they consist of masses of cells exactly resembling the original growth, but

quite different from the cells forming the tissue in which they have settled. We must conclude—in the absence of evidence to the contrary—that secondary growths are formed by the carriage of fragments of the primary tumour to distant parts of the body. We know of no infective process in which this occurs—in which one cell, the parasite, is carried by another, the tissue-cell, to found a new colony by stimulating its bearer to rapid multiplication.

A further difficulty in the way of our accepting a parasitic cause of tumour-formation is afforded by the constant character of the structure seen in different kinds of growth. A squamous epithelioma will give rise to a development of squamous cells in the neighbouring glands, while a glandular cancer will equally produce metastatic growths of a kind exactly resembling itself. If a parasite were the cause of the growth we should expect all epithelial tumours to have a closely similar structure, just as all "granulomata" are almost identical in microscopical build. Are we to suppose a separate parasite for each variety of tumour, or rather that one infective agent is somehow modified by its surroundings, so as to produce at one time a glandular cancer, at another a columnar epithelioma, at another a sarcoma? The difficulties in either case are very considerable. The parasitic hypothesis is seductive as affording at least a remote prospect of finding a cure for the disease, but it must be admitted by any impartial observer that the *prima facie* evidence is against rather than in favour of such a mode of causation.

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**Known Factors in the Causation of Tumours.**

IT is certain that, on the one hand, there is a class of tumours due to developmental defects—to displacement or abnormal growth of certain cells in the fœtus. Tumours of this class are the teratomata, such as dermoid cysts. On the other hand it cannot be doubted that irritation has a share in the production of tumours such as warts, while it is almost certainly an important factor in others, such as the forms of carcinoma associated with workers in tar or paraffin, or the cancer of the scrotum of chimney-sweeps. Epithelioma of the lip, as pointed out by Sir Thornley Stoker in his paper in our present number, is closely connected with the irritation

produced by the smoking of a short clay pipe: one example which he quotes of a man who developed an epithelioma in the centre of his lower lip—a very uncommon place—and who acknowledged that he always held his pipe in this median position, is very striking. Cancer of the tongue is similarly at times associated with the irritation of a ragged tooth.

* * * * *

**Pre-cancerous Conditions.**

CLOSELY connected with this subject of irritation are the conditions which are recognised as frequently preceding and leading to cancer. Well-known instances are leucoplakia of the tongue and the peculiar condition of the skin of the nipple associated with the name of Paget. Another disease which as far as is known invariably ends in the production of malignant growths is the rare skin-affection called xerodermia pigmentosa, which begins as an exaggerated freckling of the skin; and this association of pigmentation with cancer is somewhat analogous to the origin of melanotic tumours from pigmented moles, of which an account was given in the February number of THE PRACTITIONER by Mr. Frederick Eve. A congenital element may be seen in these last cases, but irritation often seems to act as the exciting cause of the malignancy. To speak of a pre-cancerous stage may seem improper, since it may be argued that a condition is either cancer or not cancer, and that while it is not cancer it is not legitimate to speak of it as pre-cancerous, the subsequent appearance of malignant disease being still problematical. But the association of some conditions with epithelial tumours is so frequent that it is well to direct attention to the connection between them, in order that every care may be taken to forestall any advance of the cancerous development to a point beyond the reach of operative relief.

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**Traumatism as a Cause of Cancer.**

PATIENTS not infrequently assign as the starting-point of a tumour some accidental injury which they have received on a previous occasion. It is not by any means impossible that this connection between cancer and traumatism may be a real one. An example pointing in this direction is afforded by

cancer of the cervix uteri, which is infrequent in sterile women whose cervical canal has not been exposed to the lacerations which occur in parturition, whereas cancer of the body of the uterus is as common in such patients as in those who have borne children. Instances of the direct development of cancer on single wounds are recorded. We remember hearing from the late Dr. Charles Arkle of the case of a young lady who cut her forehead by falling against a stanchion on board ship; the wound refused to heal, and microscopical examination showed it to be epitheliomatous, although she had previously been in excellent health.

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**A Theory that embraces the Facts.**

In order to bring into line the facts which appear to be established we may suppose that what is necessary for the formation of a tumour is that certain cells of the body must be in some way separated from their normal connection with their neighbours. This may be the result of congenital mal-development, a group of units somehow going astray in the process of evolution of the fœtus; or it may be due to a momentary trauma by which they are displaced; or it may occur in the course of inflammatory changes resulting from irritation. Cells thus cut off from their organic connection may develop on their own account in an irregular manner, paying no heed, if we may so put it, to the needs of the organism as a whole. The tumour may go on growing when the rest of the body is wasting to a shadow. It is not subject to the laws that regulate the growth of the other tissues. It is functionless, and acts as a parasite, absorbing nourishment which is withdrawn from the working parts. Its cells increase with undue rapidity, and produce a short-lived progeny, which break down into all sorts of degenerative products, fatty, mucoid, colloid, &c. Some controlling force seems to be wanting, which guides the development of normal tissues in an orderly way. It seems legitimate to suggest that the controlling force which is absent is the influence of the nervous system, for tumours are devoid of nerves. It is not yet admitted by physiologists that the nervous system does exercise a direct influence over all the tissues of the

human body, but clinical evidence points strongly in this direction; whereas the impossibility of producing trophic phenomena in a rabbit or a cat does not afford any valid reason for disbelieving in the existence of trophic nerves in man.

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**Cancer-Houses and Local Infection.**

AN interesting contribution to the literature bearing on the local prevalence of cancer is made in our present number by Mr. D'Arcy Power. The district of which he narrates the story certainly seems to have had more than its due share of cancer-mortality. Individual houses have been said to be infected in some way with the disease, many more cases of it occurring in them than would be warranted on strict theories of probability. It cannot be said that the existence of such local infectivity is by any means proved at present, "the long arm of coincidence" not being eliminated in the small number of cases at present put on record. Similarly we have in the last few days read in the daily press of a house in France in which there was an epidemic of suicides, but it is not suggested that there was a microbial cause for the latter. Cancer has been said also to be a disease especially prevalent along the banks of great rivers; but as these are the seats of the densest population, not much is proved by the discovery. There seems good reason to believe that modern conditions of life are associated with a higher death-rate from this malady than more primitive states of civilisation.

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**Cancer of the Tongue.**

FEW, if any, diseases can be more distressing to witness, or more terrible to be the subject of, than cancer of the tongue, with which our present number mainly deals. It is curious, as pointed out by Mr. Roughton, that so frequently we find that sufferers from this malady put off asking medical advice until it is too late for surgery to remove the disease. It is most important here as elsewhere to recognise the nature of the growth while it is yet in an early stage, at which time there is good ground for hope that free removal will result in either complete cure or at least in a long period of respite before recurrence takes

place. Patients who are affected with leucoplakia, fissures or other conditions which frequently precede cancer, should be warned to keep a close watch for any further development, while it is most important that dental surgeons who are constantly looking into people's mouths should be well acquainted with the appearance of early carcinoma. In some cases diagnosis may be difficult, and of such Mr. Butlin brings forward very interesting examples, in which even his experience was at fault; but there can be no doubt that in the presence of a nodule that may possibly be cancerous removal should be practised, as a microscopical examination will clear up the matter, while hesitation may prove fatal. In cases of doubt it will not be necessary at once to remove the whole tongue, but the growth itself, or a portion of it, can be excited. In the case of sarcoma of the tongue, as pointed out by Mr. Fripp, such removal of a piece of growth may be followed by rapid fungation of the remainder, so that the patient must be kept in view and be prepared to submit to a radical operation if such an occurrence takes place. The culpability of waiting for the appearance of enlarged glands before diagnosing cancer, and the misleading character of other statements in the text books with regard to this affection, are forcibly pointed out by Mr. Hutchinson.

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**Operation for Cancer of the Tongue.**

On one point the writers in our present number appear to lay considerable stress, and that is the advisability of dealing with affections of the tongue before they actually become malignant. It may seem a strong measure to remove a tongue that is not already cancerous; but there can be no doubt that in many instances this would be a wise course, and would save valuable lives. In cases of more advanced disease the question of operation is one of considerable difficulty. It is only in quite early cases that the patient can look forward with any confidence to a complete cure without recurrence in the glands or the stump. Yet even in comparatively advanced cases it is well worth considering whether, with a view to the relief of the disease in the mouth, and the prevention of the miserable condition into which untreated cases drift, removal of the local affection is not called for

even in patients who will almost certainly be subject to more or less rapid recurrence elsewhere. Such a principle of action will not lead to the compilation of favourable statistics of operative successes, but in our opinion it is the humane and the right course to follow. Patients may not thus have their lives greatly prolonged, but they will have the short period of life which is left to them rendered more endurable.

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**The Power of Speech after Removal of the Tongue.**

ONE of the effects of removal of the tongue most dreaded by patients is loss or defect of power of speech. On this point we have before us a comparatively cheering message. Thus Mr. Jacobson tells of a patient who had his whole tongue removed, and who was yet capable of telling a complicated story of the Indian Mutiny, involving difficult Oriental names, in a completely intelligible manner. Certain letters may be defectively pronounced, but it is surprising how little noticeable is the difference in speech before and after this operation. One great cause of hesitation as to performing or undergoing this operation is thus rendered less weighty. The risk of the procedure itself in a patient still robust is probably not very great, while the risk of allowing conditions to persist which may at any time drift imperceptibly into cancer is truly formidable.

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**Cancer in Ireland.**

AN interesting report has recently been published by the Registrar-General for Ireland on the subject of cancer as it occurs in that country. Here as elsewhere the death-rate from cancer has tended to increase pretty steadily from year to year, as we find it has risen from 4·6 per 10,000 of population in 1891 to 6·1 in 1900. The distribution of the disease in different parts of Ireland varies considerably; thus in the greater part of the western districts it is about 3, while in Armagh it reaches over 10 per 10,000. Statistics given for different European countries show a similar difference in incidence of cancer; thus in Hungary the rate is given as 3·3 per 10,000, while in Bavaria it is 9·9 for the same year, 1900. Not much light is shed on the ætiology of the malady in this Report,

answers from different registrars exhibiting varying opinions as to the heredity and infectivity of cancer, and as to special causes such as soil, humidity, general hygiene, and traumatism. The question of the relation between cancer and tuberculosis comes under review, and a table is given showing the incidence of the two diseases in a particular family. The death-rate from cancer in the two sexes maintains a very constant ratio, women constituting about 55 per cent., and men 45 per cent., respectively. It is interesting to observe that in spite of the frequency of malignant disease of the breast and uterus, which together account for the greater incidence of the disease in women, yet even in this sex cancer of the stomach carries off a greater number of victims than that either of the breast or of the uterus; 363 women dying in 1901 of the gastric complaint, while in 237 the mamma was the seat of disease, and in 265 the womb.

# THE PRACTITIONER.

**JUNE, 1903.**


## A FEW LESSONS FROM FIFTY CASES OF OPERATION FOR CARCINOMA OF THE TONGUE.


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(Continued from p. 625.)

### METHODS OF OPERATING.

It is right that I should state here that I am familiar only with two, Mr. Whitehead's intra-buccal and Prof. Syme's operation through the floor of the mouth. Increasing experience confirms in my mind the value of Whitehead's method. I believe that I am correct in considering that Prof. Kocher's operation is distinctly more severe, and in stating that he now practises the intra-buccal method more frequently than he did.

To take *seriatim* the advantages claimed by Professor Kocher for his submaxillary method,[1] he holds that :—(1) *It gives very good access.* I am of opinion that by slitting the cheek, when needful, the access given by the intra-buccal method is quite as good. While the cheek, in spite of its usually rapid healing, should never be slit, if possible, in patients the subjects of tongue-cancer and often broken down with some bronchitis and emphysema, on account of the further interference with the power of swallowing, spitting out of saliva, &c., this step must often be taken when the cancer is situated far back and the frequently edentulous jaws of these patients interfere with efficient use of the gag. But even this difficulty may be overcome by the employment of Dr. Hewitt's wheel-handled gag (Weiss), a very powerful and efficient means of opening the mouth when there are no teeth far back to support the leverage of the ordinary instruments. I will here give a hint to my younger brethren, before performing an operation for removal of the tongue always to note the condition of the molar teeth. (2) *It permits of the simultaneous removal of the glands as well as of all the tissues which*

[1] *Operative Surgery*, edited by Harold J. Stiles, p. 76.

*intervene between them and the primary seat of the disease.* As far as the glands are concerned this is true, and at first sight it is a distinct advantage over the intra-buccal method, but I have never considered this advantage so real as to lead me to abandon Whitehead's method. When the submaxillary glands are involved by cancer, my experience teaches me that the deep carotid group are also infected, though, to the unaided eye, they may appear healthy. The complete removal of all glands that may be affected involves a long and most careful dissection. I am of opinion that the close of such a severe operation as removal of the tongue is not the time for such a dissection. The majority of patients are not fit to bear further operative steps, necessarily prolonged. Few surgeons undertaking it will do justice to themselves. To mention one point only, the first part of the operation may be unexpectedly prolonged owing to difficulties with the anæsthetic. In such a case the removal of the tongue may be somewhat hurried, to save time for the operation on the glands. This certainly risks imperfect securing of vessels and subsequent hæmorrhage and broncho-pneumonia. The anæsthetist has also to be considered. As I have stated below on the subject of removal of glands, I think the best results will usually be secured by performing this as a second operation about two weeks after the first.

As to the second claim made by Professor Kocher, that this method removes all the tissues which intervene between the glands and the primary seat of the disease, I am unable to admit it. I cannot see how any operation, whether by the submaxillary or the intra-buccal route, can make certain of removing the lymphatic tract which runs under the jaw between the cancer and the glands. Even removing a portion of the jaw as a regular step would not make certain of this tract; and being not only uncertain but also adding enormously to the patient's discomfort immediately after the operation and for the rest of his life, this course is no more justifiable than removing part of the clavicle at the time of amputation of the breast with a view to extirpating the lymphatic tract which passes behind the vessels between the axillary lymphatics and those above the clavicle. (3) *It admits of preliminary ligature of the lingual or external carotid artery.* This claim is a just one, but any surgeon familiar with the intra-buccal method

can dispense with this step, if he knows where to look for the lingual arteries, especially if he make use of the simple directions given by Mr. Cathcart, of Edinburgh, to which I shall refer a little later. (4) *This method admits of the preliminary tracheotomy and plugging the pharynx.* This step, which I look on as very valuable, for its help in preventing that septic pneumonia which may be started by entrance of blood at the time of the operation, can be equally well performed as a preliminary to the intra-buccal method. I always employ laryngotomy in hospital practice where really skilled anæsthetists are not always available—and then one has to trust to a house-surgeon who is not as experienced as he is willing—and whenever the growth has involved the junction of the middle and posterior thirds of the tongue. Laryngotomy I consider much simpler than a tracheotomy, and quite as efficient: the tube is nearly always removed as soon as the operation is over. (5) *The submaxillary method has the advantage from the point of view of antisepsis.* This is partly true, and it undoubtedly affords good drainage; but I believe that, with the floor of the mouth opened, those operators who use the submaxillary method have found it very difficult, with all their care and pains, to keep the wound aseptic. Anyone who is acquainted with the microörganisms which inhabit a healthy mouth with normal saliva, with normal deglutition, and the usual free movements of the tongue, &c., will understand the futility, after an operation for removal of the tongue, of trying to keep the wound aseptic by plugging with sterilised gauze changed twice (or oftener) in every twelve hours.

My opinion that in the great majority of cases Mr. Whitehead's intra-buccal method is the best has been much strengthened since I read the second edition of Mr. Butlin's *Operative Surgery of Malignant Disease*, where he says (p. 154), "Whitehead's operation for the removal of one part or the whole of the tongue has been my stock operation for the past ten or more years." I believe that my first two operations in 1881 at Guy's Hospital were the earliest of this method to be performed in London. I have modified it somewhat, *e.g.*, by the frequency, already alluded to, with which I make use of laryngotomy and in availing myself of Cathcart's method of securing the lingual arteries (p. 735), but the

22 years' experience which I have had of it have only confirmed my opinion of its value. In those cases in which the floor of the mouth is involved, the jaw must be divided and resected; but the cases in which this step is needed are few.

I now turn to the chief points which my experience of the above operation would lead me to emphasise. For as many days as possible before the operation the patient should himself practise keeping his mouth clean. He should brush his teeth two or three times in the day thoroughly, and make himself handy in washing out his mouth, and in the use of a feeder and tube. Much too often these most important steps are left till after the operation, and to a nurse. If practised beforehand they occupy the patient's thoughts, and after the operation they are not a new thing to him; and no one, however much in earnest, can carry it out as well and as painlessly as the patient himself. As to the mouth-wash used, I am of opinion that it is not so much any particular kind that is of value, but the way in which it is used; and, from its unirritating nature, I usually tell the patients to use Condy's fluid. If needful, which it very rarely is, the attendant may employ solutions of formalin or iodoform at occasional intervals. Before the operation the surgeon should take note of the teeth, as to their cleanness, and whether sufficient molars are present to take the leverage of the ordinary gag. If this is not the case, he should be provided with Dr. Hewitt's wheel-gag to which I have alluded. He should also be quite clear in his mind as to the extent of the growth. The transverse incision behind the growth should always lie a full inch posterior to the cancer. Only in some cases involving the posterior third is this sometimes impracticable. Even in doubtful cases it will be wiser to make a rule to adopt the the above margin. Every surgical registrar of experience is familiar with one or two cases when he has been asked to clear up the nature of an ulcer of the tongue in which different opinions have been expressed as to its malignancy. In such cases he may have to cut section after section before he finds the part which is actually epithelioma. If this be so in section-cutting, it is clear that, if the portion actually epithelomatous lie at the back of the sore, the surgeon who cuts within three-quarters or half an inch of the sore may be removing too little. If he leaves any examination to be made at the time

of the operation, his finger may not only become septic, if he be dealing with an ulcer, as is usually the case, but he will very likely start bleeding, which is needless, and may be embarrassing, if the anæsthetic at that moment be causing difficulties. A good light is absolutely essential; no tongue should be removed on a foggy day, not only on account of the light, but of the probability of subsequent respiratory trouble. I have never found an electric forehead-lamp needed. If an efficient gag be at hand, one cheek well retracted with the finger of an assistant, or slit, if necessary, the tongue, as the incisions are made, comes quickly out of the mouth and is well under control. Of my custom with regard to a preliminary laryngotomy I have spoken above.

As to the position of the patient, unless a very skilled anæsthetist is present, I have the head and shoulders propped up, and the former well turned over towards one side, *i.e.*, the one opposite to the gag. Where a skilled anæsthetist is present, I have the head low and turned towards the edge of the table. In either case the dependent cheek is retracted or slit, and an assistant is told off to keep the cheek-pouch emptied of blood. The first position is less fatiguing to the operator.

The question of slitting the tongue and saving half I have come to decide as follows. I very rarely or never do it in cases which are actually cancerous. My reason is that it is certain that, while an epithelioma may appear quite limited to one half of the tongue, it may have crossed the middle line more deeply. This explains those cases when the glands on the opposite side to the disease become unexpectedly enlarged. I may also add that in the years 1895 and 1896 I saw no fewer than three cases in which half of the tongue had been removed for cancer by a younger and more advanced surgeon than myself, and in each local recurrence had taken place. Now a local recurrence, save when the floor of the mouth is involved, or when the disease is well back in the posterior third of the tongue, and the scissors cannot be placed a full inch behind the disease, should never be allowed to occur. I am very strongly of opinion that the old belief that epithelioma is a local form of cancer, and therefore a less malignant one, has led to operations being performed much too near the disease; and that even in the

lip (one of the simplest of all epitheliomata), owing to the above belief and the use of a single V-shaped incision, the results, if a large number of cases were watched and honestly reported, would be found to be most discreditable to us. As to the anæsthetic, unless in skilled hands, I prefer A.C.E. or ether first, followed by chloroform. If the anæsthetist watch the tint of the lips, cheeks, and ears he need not render himself and the operator anxious by repeated, more or less furtive, examinations of the radial pulse. As long as the parts mentioned above are sufficiently red or pink all is well: they quickly show a tendency to lividity on the one hand, and pallor on the other. As I have said elsewhere, I look upon the anæsthetist in these cases as of equal importance to the operator. Scarcely any other cases demand so clearly that the latter should be absolutely occupied by the operation alone, and free from any other embarrassment. The less experienced may find that some dyspnœa is often produced after a laryngotomy when the sponge is thrust down into the pharynx.

There is no occasion for me to deal here *seriatim* with the steps of the operation which are well known to most, and with which I have dealt very fully elsewhere. But one or two lessons which I have learnt may be alluded to here. In some cases the cancer involves the frænum linguæ. If this extension be deep, part of the mandible must be resected. Wiring after such resection will nearly always be possible. When the extension is less marked, the surgeon will sometimes find that after having all the incisor teeth drawn, and the tongue well raised by a ligature or forceps, he will be able to use his scissors so as to get sufficiently below the growth. But where this is doubtful resection of the centre of the mandible must be performed. I need scarcely say that it is useless going a full inch behind the growth in the transverse section through the tongue, but only a quarter of an inch below it. This will certainly be the result if the teeth are not drawn and if the scissors are manipulated in the hampered way entailed by the presence of the incisors.

The question of the best means of meeting hæmorrhage deserves a few words. By far the simplest is that of Mr. Cathcart, surgeon to the Edinburgh Royal Infirmary. Many of us have been in the habit of finding the lingual artery by

cutting down on it gradually as the deeper parts of the tongue are divided. Mr. Cathcart [1] has put this most important step on a definite anatomical basis. His method is founded on the fact that the hyoglossus under which the lingual artery runs, though attached to the posterior third of the tongue, can be reached from the mouth when the tongue is drawn far out, and the mucous membrane has been divided between it and the jaw. The jaws being opened widely, and the tongue drawn forwards with a stout silk ligature in each half, the mucous membrane is divided along the middle line of the dorsum, behind the growth and between the tongue and the jaw; the tongue is split and the fibres of the genio-hyoglossus divided close to the symphysis with scissors. The diseased half of the tongue can now be drawn well out of the mouth, especially if the anterior pillars of the fauces have been snipped through as well. With a few vertical strokes of a director the anterior edge of the hyoglossus is next defined. The director is then insinuated beneath the muscle, the tissues being separated with the point before the instrument is pushed on. The muscle is next carefully cut through on the director for about two thirds of its extent, and the fibres retracting leave the artery at the bottom of the wound covered only by a little connective tissue. With the point of a director the vessel can then be easily defined as a bluish cord, and traced downwards and backwards. An aneurysm-needle should then be passed under it, and the vessel tied before it is cut. Some may prefer to seize it with forceps and cut before tying it, but the previous ligature is easier. After the artery has been ligatured and divided, a few snips should be made with the scissors radiating out from the ligatured artery into the substance of the tongue; this lessens the chance of cutting the artery again in the later stages of the operation. All that now remains to be done is to complete the operation, cutting wide of the disease. The advantages claimed by Mr. Cathcart for his method—and anyone making use of it will confirm every word that he says—are ease and certainty in securing the lingual; diminished bleeding from small vessels; greater certainty in cutting wide of the disease; along with an intact condition of the tissues of the neck for subsequent removal of the submaxillary and

[1] *Annals of Surgery*, July, 1902, p. 15.

lymphatic glands, as recommended by Mr. Butlin. On carrying out the procedure in the dissecting room Mr. Cathcart finds that, by his method, the same part of the artery is reached that is tied in the usual operation for a preliminary ligature in the submaxillary triangle.

Another method which will occasionally be found serviceable is that of Mr. C. Heath. If any difficulty occur in dealing with a divided lingual (Mr. Cathcart's methodical plan should prevent this), especially when the tongue has been severed far back, Mr. Heath advises that one or two fingers should be hooked into the pharynx over the stump of the tongue, so as to draw this forward. This step at once arrests the hæmorrhage by pressure, and usually brings into view the bleeding point, which is then tied. The following case illustrates the value of this method:—I had, three years ago, removed the entire tongue in a patient, aged 63, a retired army surgeon. The section had been made immediately in front of the epiglottis, and the condition of the mouth is well shown in Fig. 199, p. 455 of the last edition of the *Operations of Surgery*. I have referred previously [1] to the excellent power of speech preserved in this case. Some difficulty had been met with in securing either the left dorsalis linguæ or the left lingual artery which had been divided very far back and low down. Half an hour after the patient had been put back to bed, while I was sitting beside him, blood began to well up into the mouth on the left side, the bleeding-point being just out of sight. Being alone with the patient I arrested the hæmorrhage, first, by the adoption of Mr. Heath's plan, and then succeeded in clamping the bleeding-point with a curved pair of Spencer Wells' forceps. These the patient—a man who could command indomitable courage — kept on for some hours. No bleeding followed their removal, and an excellent recovery ensued. The patient lived for three years, and then died of bronchitis and cardiac failure, the bronchitis being without doubt aggravated by the difficulty in expectoration after so complete a removal of the tongue. To the surprising degree of distinctness of the speech of this patient, in spite of there being nothing left save the floor of the mouth and the palate and lips, I have alluded at p. 623.

[1] THE PRACTITIONER, May, 1903, p. 623.

There remain only two points to which I shall refer, viz., the questions of the advisability of removal of half the tongue, and that of operation on the lymphatic glands.

*Removal of half of the tongue by splitting it longitudinally.* I have already alluded to this point. For reasons given above I do not recommend this operation as strongly as I used to do. I still feel the strength of the words used by myself (*Guy's Hospital Reports*, 1889, p. 252) that if patients could be assured that by early operation half only of the tongue would require removal, they would submit much more readily to an operation which they dread so peculiarly, and to the putting off of which is due the smallness of the percentage of permanent cures. Increasing experience has shown to me that the cases to which this limited operation is suited, and in which alone it can promise a safety from recurrence, are extremely few. I have already referred to cases which came under my notice where, after removal of half the tongue, a local recurrence had taken place. When the question of removing only half the tongue by splitting it longitudinally arises I make the variety of the disease my guide. When the disease is precancerous this operation is usually quite justifiable. But such cases are rare. I doubt if in the next 20 years there will be much diminution in syphilis of the tongue, though I hope that I may be wrong; and if I am right, and syphilis continues to produce precancerous conditions as frequently as it has during the last 20 years, I hope that, for the credit of our profession, our course of action will be more prompt and decisive, and that there will be less of that fatal loss of time.

To pass from precancerous cases to those in which epithelioma is actually present, it is well known that this disease presents itself in two chief clinical forms: (a) *The more or less warty variety* growing at first outwards and accompanied by only superficial ulceration, if any. Here removal of one half of the tongue is justifiable; but these cases are notoriously extremely rare in the tongue. (b) *The ulcerating form.* This is infinitely the more common, and those which have been sent to me have been usually advanced and established. I would never remove half the tongue in these cases unless the ulceration is recent and evidently superficial, and limited, beyond all question, to the side of the tongue. I would make

one other exception. In the case of an epithelioma situated far back, on the posterior third of the tongue, attacking the lateral aspect, but not limited to the side and edge of the tongue, in a young subject with perhaps a long life before him, I would remove half the tongue instead of operating on the wider lines which I prefer on account of the difficulty, if not the impossibility, of being certain how far the cancer has extended deeply. In such cases the patient must take the responsibility and the risk of local recurrence. I have only one case to justify the above teaching. It is that of a gentleman, æt. 34, who had epithelioma of the left half of the tongue far back in the posterior third. The ulceration, dating back to syphilitic lesions, was stated to be of five weeks' duration and was superficial in character. My diagnosis of epithelioma, based on the character of the induration present at one spot, and at one only, was doubted by the practitioner in charge of the case. After removal of one half of the tongue it was quite clear to the unaided eye that at one small spot the ulceration had become epitheliomatous. The specimen was examined by an expert in London, and I believe also in Berlin. The slides shown to me were typical of epithelioma. The patient remains well four and a half years after the operation. I should like to point out that this advice to remove both halves of the tongue well behind the disease in every case where the disease, though *apparently* superficial and limited, may from the duration and other facts have extended more deeply, is not the same thing as the advice to remove the entire tongue in every case of cancer, with which it has been confused.

To one more point connected with removal of half the tongue I would draw attention. I have, perhaps, allowed myself to be unduly influenced by the cases operated on by others in which after removal of one half of the tongue the disease persisted in the other. I have, perhaps, been biassed by the pronounced and advanced condition of the disease in the great majority of the cases which have come under my care. Whether this be so or not, I would point out that it is not only in the opposite half of the tongue that, after removal of one half, the disease may reappear. The risk of recurrence in the floor of the mouth on the same side is always to be

remembered. It is not only in making the transverse section through the tongue behind the disease, but also in dealing with the mucous membrane adjacent to and below it, that a wide area must be given. And this latter step is one which may be extremely difficult. I have found that to secure this object it is well not to trust to raising the tongue by the ligature in front, but to lift it up and carry it towards the opposite side with forceps applied laterally, so as to open out the mucous membrane near the ulcer in the floor of the mouth and between the side of the tongue and the jaw.

At this stage also the hæmorrhage should be under control, and the mouth as dry as possible; otherwise the scissors in the division of the mucous membrane may go perilously near the growth. It need scarcely be added that these cases require the most careful watching afterwards at regular stated intervals.

*Removal of Glands.*—Two chief questions arise here for answer. A. Should a routine operation be performed for the lymphatic glands in every case, whether the glands can be felt or no, just as in the operation usually performed for cancer of the breast? B. How far are later operations on the glands justified in cases in which they are noticed to be enlarged at a varying date after the operation on the tongue?

A. *The Advisability of removing the Glands as a matter of Routine.*—I advocate this step, recommended by Mr. Butlin, very strongly on the following grounds:—(i.) We can never tell in what cases invasion of the glands will follow. That it follows in a very large proportion, and, what is more, in many apparently most favourable cases, is certain. Mr. Butlin puts the percentage as follows:—"About 70 per cent. of the cases can be so successfully treated by operation that there is little fear of recurrence *in situ*, but of these 70 probably 30 will die, perhaps as many as 40, of affection of glands in the neck." Mr. Hutchinson[1] tells us "that in at least three fourths of my cases sooner or later the disease has recurred in the glands. In many the interval has been very considerable, and the good to the patient has been very definite; but experience compels the admission that, however early the stage at which the operation for cancer of the tongue is performed, the probability is very great that enlargement of the lymphatic

[1] *Brit. Med. Journ.*, 1891, Vol. II., p. 1191.

glands will sooner or later follow." (ii.) We know perfectly well that infection of the glands begins in epithelioma of the tongue and elsewhere almost from the day that the ulcer assumed suspicious features. We know equally well that the same infection may be caused by ulcers of the smallest size and of trivial appearance. as well as of the briefest duration of the malignant state. (iii.) We are quite familiar with the fact, which is not sufficiently acted up to, that infection of the glands is not only ultimately certain and often rapid and early, but also peculiarly baneful. Thus when epitheliomatous glands are operated on, unless they are in the earliest stage and the affection is very limited, the following conditions will interfere with thorough and complete extirpation of the disease :—(α) The number of the glands and the abundant communications between the different groups ; the importance of the structures closely adjacent to the deeper one ; and the fact that glands may be affected and yet be so minute as to escape the most careful operator. (β) The presence, only too often, of septic infection (the original trouble being usually an ulcer), as well as of epitheliomatous deposit in the glands, so mats them to adjacent parts as to make it often quite impossible to extirpate the glands completely. Inflammatory softening having set in leads to the glands breaking down during attempts at their removal, with the result that shells, still the seat of cancerous foci, are left behind. These relics, owing to the vascularity of the adjacent parts, do not die, but preserve sufficient vitality to act, a little later, as centres of reappearing disease. (iv.) The neck is a part which lends itself readily to healing, and that with scars which are ultimately not very disfiguring, especially in males. (v.) A fact that is not yet sufficiently recognised is that deposit of epithelioma may remain latent for two or three years certainly, and then evoke disease. This fact has long been recognised by operative surgeons in the case of carcinoma of the breast. I have myself had a case in which a carcinomatous deposit began to take on activity 15 years after the breast had been removed in 1877. Owing to the fact that in epithelioma of the tongue usually the glands become affected from an ulcer which is inflamed and more or less septic, the period of latency of the deposits in the glands is very much less. As a rule the patient is

safe if a year and a half have elapsed since the removal of the epithelioma and there is no evidence that the glands are involved. For the whole of this time he should be under regular supervision. Occasionally the mischief in the glands appears at a later period; I have had one case in which nearly two years had elapsed. Some surgeons go much further. Thus Mr. Bland Sutton[1] states the recurrence in the stump or cervical glands "is in some cases delayed for five or even seven years." Recurrence in the stump, as I have stated above, I have rarely seen; and while, from what we see in carcinoma of the breast, I should consider it quite possible for epitheliomatous cells to remain latent in the glands for as long as five years, I should, considering the surface from which, and the conditions under which, the epitheliomatous cells find their way into the lymphatics, look upon such an interval as quite exceptional. When in the case of an epithelioma which has been widely dealt with there is no recurrence within two years, the patient is to be looked upon as usually safe. Where a recurrence is stated to have taken place in the stump after an interval of five or seven years, I should think it much more likely that a second and independent focus of disease has appeared in one of the multiple syphilitic lesions which these tongues often show.

For the reasons given above, the submaxillary glands, those in the anterior triangle, especially the submental (a group which is often overlooked), and the deep cervical glands, should always be explored as a matter of routine in patients with ulcerated cancer of the tongue, particularly in hospital patients, owing to the more advanced stage of the disease met with in them, and the difficulty of keeping them under observation. By adopting this routine practice, no doubt, a few needlessly extensive operations will be performed, as in the case of the breast. But with cancer of the tongue, as with cancer of the breast, while we admit that in a certain number—say, 4 or 5 per cent. in the breast and 15 per cent. in the case of the tongue—the disease may not have reached the glands, and therefore their removal may be superfluous, we do not know which these cases are. Until our knowledge of cancer is more complete, and till human nature has greatly changed and cases

[1] *Tumours Innocent and Malignant*, p. 262.

of cancer come to us much earlier, we must confess that our power of selection of cases is sadly limited, and we must act accordingly. Hitherto we have too much left the question to chance, and the result has been that many most successful operations on cancer of the tongue have been rendered fruitless by the reappearance of cancer in the glands, which at the time of the primary operation appeared perfectly healthy. The operation should be performed two to four weeks after that on the tongue, according to the severity of the primary operation and the stage of recovery reached by the patient. The three groups chiefly affected—the submental, submaxillary, and the deep cervical—should be exposed in the fullest way by an incision along the whole length of the anterior border of the sternomastoid, and a second from a point just below the chin to the level of the hyoid bone and thence across the anterior triangle to join the former one. By this means two flaps are dissected up; one, above, with its base along the mandible well supplied with blood from the face, and continuous with a region into which the surgeon will not have to go; the other, below, will have its base attached along the middle line of the neck from the hyoid bone to the sternum. The above-mentioned three groups of glands should be extirpated as thoroughly as possible. The submental is often overlooked. Removal of the submaxillary group involves, of course, taking away the submaxillary salivary gland, in which lymphatic glands may be embedded. The deep cervical group should be removed from their highest accessible point at the angle of the jaw, down to the sternum. It will be well not to give the patient any definite promise as to the future. Glands may be so small as to escape detection and yet contain foci of disease. In cases in which the tongue has been extensively removed, the anæsthetic may give trouble at this second operation.

B. *Advisability of operating on Enlarged Glands at a later date*, i.e., *some time after the operation on the Tongue.*—While this step must be taken sometimes, the conditions are infinitely less favourable. There are few more difficult questions to decide than those which may arise in these cases. The patient, perhaps, in the prime of life, with a soundly-healed scar in the mouth, comes again to the surgeon, perhaps after a long

interval of health, with infected cervical glands, and urges further operation. Each case must be decided upon its own merits. I would impress the following upon my younger readers :—(1.) It is no good operating when the glands are involved under the upper third of the sternomastoid, reaching to the mastoid process behind, and the angle of the jaw in front. This region is one most difficult to dissect or work in at any time, owing to the way in which the attachment of the muscle is fixed to adjacent parts, and tied down by different processes of deep cervical fascia. I believe that when glands are affected beneath this part of the sterno-mastoid, those in the pterygoid region are involved also, and division of the muscle will be useless. (2.) Operation will, in my opinion, be futile, (*a*) when any of the infected glands are soft, necrotic, and breaking down; (*b*) when both anterior triangles contain enlarged glands.

# TOTAL EXTIRPATION OF THE PROSTATE FOR RADICAL CURE OF ENLARGEMENT OF THAT ORGAN.

By P. J. FREYER, M.A., M.D., M.Ch.,
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[With Plates LXX.–LXXIII.]

In a lecture delivered by me at the Medical Graduates' College and Polyclinic on June 26, and published in the *British Medical Journal* of July 20, 1901, I placed before the profession at large my new operation of total extirpation of the prostate for radical cure of enlargement of that organ. I then gave details of four cases in which this operation had been successfully performed by me. Since then I have from time to time published in the same journal lectures and papers dealing with further groups of cases of the operation, and recording various developments of the operation and reflections thereon, derived from constantly-increasing experience. In this manner full details of my first 31 cases of the operation have been submitted for the consideration of the profession. The subject is of such vital importance to poor old suffering male humanity, and has aroused so great an interest in the profession all the world over—second to none, I venture to say, that has come before it for many years—that I readily comply with the invitation of the editor of THE PRACTITIONER for a paper thereon.

Though, in the lectures and papers referred to, I have endeavoured to describe as clearly as possible the details of the operation, as also the anatomical and pathological considerations that render it feasible, I am aware from conversations which I have had with many medical men that they find it difficult to comprehend. The chief cause of this difficulty lies in the defective ideas as to the structure of the prostate and its coverings which most of us imbibed in our student-days. The text-books as a rule treat that organ as a single body with a canal tunnelled through it in the form of the prostatic urethra. I must ask the reader to suspend for the

present his preconceived notions regarding the constitution of this organ, and to bear with me whilst I endeavour to describe briefly the structural features and external relations of the prostate, as deduced by me from careful examination of the morbid specimens removed in my operation. In this description I was, I find, anticipated in most part years ago by that eminent surgeon, Sir Henry Thompson, as the result of many careful dissections of both the normal and the enlarged prostate; but these views, strange to say, have hitherto received but scanty recognition in the various text-books.

The prostate is in reality composed of twin organs, of apparently purely sexual function, which in some of the lower animals remain distinct and separate throughout life, as they exist in the human male during the first four months of fœtal existence. After that period, in the human fœtus, they approach each other, and their inner aspects become agglutinated together, except along the course of the urethra, which they envelop in their embrace. These two glandular organs, which constitute the lateral lobes of the prostate, though welded together, as it were, to form one mass, remain, so far as their secreting substance and functions are concerned, practically as distinct as the testes, their respective gland-ducts opening into the urethra on either side of the *veru montanum*. Each of these two glandular bodies, or prostates, is enveloped by a thin, strong, fibrous capsule; and it is these capsules—less those portions of them that dip inwards, covering the opposing aspects of the glandular bodies or lobes, and thus disappear from view, being embedded in the substance of the prostatic mass—that constitute the true capsule of the prostate regarded as a whole. This capsule extends over the entire organ except along the upper and lower commissures, or bridges of tissue, that unite the lateral lobes above and below the urethra, thus filling in the gaps between them.[1] This true capsule is intimately connected with the prostatic mass and incapable of being removed from it save by dissection.

The urethra, accompanied by its surrounding structures—viz., its longitudinal and circular coats of muscles continued forwards from the bladder, its vessels and nerves — passes

[1] For descriptive purposes the prostate is supposed to be placed with its rectal aspect downwards.

forwards and upwards between, and is embraced by, the inner aspects of the two glands or lobes. The ejaculatory ducts enter the prostatic mass close together, in an interlobular depression at the lower part of its posterior aspect, each coursing along the inner surface of the corresponding lobe. They do not penetrate the capsules of the lobes, but pass forwards in the interlobular tissue, to open into the urethra.

The prostate, thus constituted and enveloped by its *true capsule*, is further encased in a second capsule or *sheath*, formed by the recto-vesical fascia, numerous connecting bands passing, however, between the two. The nomenclature here adopted is that suggested by Sir Henry Thompson in his work, *The Diseases of the Prostate*, and is both scientific and practical. Between these two capsules, or rather mainly embedded in the outer one, lies the prostatic plexus of veins, most marked in front and on the sides of the prostate. The larger arteries also lie between the true capsule and the sheath, numerous small branches passing from them through the true capsule for the supply of the prostatic substance.

There is nothing that I can call to mind that will illustrate more simply and forcibly the composition of the prostate and its coverings than an orange. If we imagine the edible portion of an orange composed of two segments only, instead of several, with the septum between them placed vertically, we have a rough and homely illustration of the formation of the prostate. The thin, strong, fibrous tissue which covers the segments of the orange, and which is intimately connected with the pulp, represents the *true capsule* of the prostate, the two segments or halves of the orange being represented by the two lobes of the prostate. Further, the rind of the orange outside all represents the outer capsule or prostatic *sheath*, formed by the recto-vesical fascia. And here let me remark that, in the operation that I shall presently set forth, it is this true capsule as above described that is removed, the sheath being left behind, thus preventing infiltration of urine into the cellular tissues of the pelvis. The text-books, as a rule, draw no distinction between the two separate coverings of the prostate, treating them both combined, or the outer one only, as "the capsule." To persons brought up in this school of thought and teaching my operation must necessarily appear impossible.

In most, if not in all, cases of enlargement of the prostate of declining life the overgrowth is adenomatous in character, numerous encapsuled adenomatous tumours being found embedded within the substance of the lobes, and frequently protruding on their surfaces. They sometimes assume the form of polypoid outgrowths, which, however, are invariably enclosed within the *true capsule*, which is pushed before them.

As the lobes enlarge they bulge out and have a tendency, each enclosed within its own capsule, to become more defined and isolated, thus recalling their separate existence in early fœtal life. They become more loosely attached along their commissures (particularly the upper one), which in the normal prostate unite them above and below the urethra. And in the course of this change the urethra, with its accompanying structures, is loosened from its close attachment to the inner surfaces of the lobes, thus facilitating its being detached and left behind uninjured in the removal of the prostate, as will presently appear.

In the earlier stages of the adenomatous overgrowth the enlargement is probably entirely extra-vesical. Its expansion in this position is, however, limited by the pubic arch above, the triangular ligament in front, and the sacrum below. As the enlargement progresses, it advances in the direction of least resistance, namely, into the bladder. The sheath which at the posterior aspect of the prostate is least defined, becomes gradually thinner and thinner as the enlargement in this direction progresses, till eventually the prostate has burst through it, and is then merely covered by the mucous membrane of the bladder. In most of the specimens of enlarged prostate removed by me in this operation a well-defined circular groove is noticeable at the junction of the intra- and extra-vesical portions. This is caused by the constriction of the growth by the sharply-defined edges of the sheath posteriorly, which become sickle-shaped on either side as the prostate shoulders its way into the bladder. It appears to me that the conformation of the sheath posteriorly largely influences the shape of the growth in the bladder. Sometimes this assumes the form commonly known as a "middle lobe," which, as can be seen from the specimens, is not a middle lobe at all—there being no such structure in the normal prostate,

as pointed out by Sir Henry Thompson more than 40 years ago—but an outgrowth from one of the lateral lobes. More frequently, however, there is a protrusion of each lateral lobe into the bladder, and this may advance to such an extent that one half, or even more, of the enlarged prostate may lie in this viscus.

These, briefly, are the anatomical and pathological considerations on which my operation is based, a comprehension of which is necessary in order to follow me in my description of the details of the procedure. My ideal operation consists in enucleating the enlarged prostate entire, in its true capsule, from the encasing sheath, leaving the urethra with its accompanying structures behind intact; though, as will appear subsequently, in more recent developments I have shown that the prostatic urethra may be torn, or even entirely removed, with equally good eventual results.

To accomplish the ideal operation, supra-pubic cystotomy is performed, after first thoroughly washing out the bladder with antiseptic lotion, as in these cases it is almost invariably septic. The catheter which is employed for this latter purpose, as well as for inflation of the bladder preliminary to performing the cystotomy, and which should be of rather stiff gum-elastic and of the largest size which the urethra will admit, is left *in situ*. The forefinger of one hand is then introduced through the wound, and a general survey of the interior of the bladder is made. The forefinger of the other hand is next introduced into the rectum, to render the prostate prominent in the bladder and keep it steady during the manipulation of the first hand. The mucous membrane over the most prominent portion of one lateral lobe, or over the so-called "middle-lobe," if there be but one prominence, is scored through by the sharpened finger-nail, and gradually detached by it from the prominent portion of the prostate in the bladder. As I have already explained, this portion of the enlarged prostate is covered merely by the mucous membrane, so that when this is scraped through and detached, the true capsule of the prostate is at once reached. Keeping the finger's point in close contact with the capsule, the enucleation of the prostate out of the enveloping sheath outside the bladder is proceeded with, by insinuating the finger-tip in succession beneath,

outside, and above one lateral lobe, thus separating the capsule from the sheath. The finger is then swept in a circular fashion from without inwards, above, and to the inner side of the lobe, detaching this from the urethra, which is felt covering the catheter and pushed upwards towards the symphisis, between the lateral lobes, which will, as a rule, have separated along their superior commissure in the course of the manipulations. The other lobe is attacked and treated in the same manner. The finger is next pushed well forwards beneath the prostate, and the anterior surface of the gland is peeled off the triangular ligament. When the prostate is felt free in its sheath and separated from the urethra, with the finger in the rectum, aided by that in the bladder, it is tilted to one side beneath the urethra and pushed into the bladder through one or other of the openings in the mucous membrane, which during the manipulations will have become considerably enlarged. The prostate, which now lies free in the bladder, is withdrawn by strong forceps through the supra-pubic wound. And here I may remark that it is astonishing through what a comparatively small supra-pubic wound a very large prostate can be delivered, owing to the elasticity and compressibility between the blades of the forceps of the adenomatous growth. Sometimes the lobes become detached along both upper and lower commissures and come away separately.

The ejaculatory ducts are left uninjured when the lobes come away separately ; but they are torn across or pulled out of the prostate when the organ is removed as a whole—a matter of trifling importance at an age when, as a rule, the reproductive powers are lost.

I have abandoned the employment of any cutting instrument for incising the mucous membrane, finding the finger-nail most convenient and expeditious. Besides, when scissors or scalpel are employed, there is danger of entering the capsule, and the guiding line being thus lost, the finger flounders about inside the capsule, enucleating isolated adenomatous tumours, instead of the whole organ in its capsule.

There is, as a rule, very little bleeding from the operation, and this is controlled by irrigation with hot lotion through the catheter.

It is astonishing with what rapidity the large cavity left by the removal of the prostate practically disappears, owing to the inherent elasticity of the sheath, the contractility of the surrounding muscles, and the pressure of the pelvic structures generally; so that by the time the irrigation is completed the cavity has almost entirely disappeared, its walls closing in and embracing the urethra. The contraction that takes place somewhat resembles that of the womb in parturition, and, no doubt, has a similar influence in checking hæmorrhage.

A stout drainage-tube is placed in the bladder through the supra-pubic wound for a few days, the abdominal wound is brought together by sutures, and the patient swathed in cotton- or wood-wool dressings. The bladder is irrigated daily with an antiseptic lotion through the drainage-tube till that is removed, and then through a catheter till the suprapubic wound is nearly closed, when automatic flushing of the bladder by the urine takes place.

It is impossible in a short paper of this kind to deal much more than comprehensively with the cases operated on by me, now numbering 45, in a period of somewhat over two years; but to convey some idea of what may be accomplished by this operation, I must refer to a few selected cases and give illustrations of the prostates removed. As full details of the cases have already been published in the lectures referred to, I must here confine myself to giving merely a brief outline of each.

*Case* 5.—This gentleman, aged 75, came from France for operation on the advice of the late Dr. Cox of Reading and Dr. Philip of Boulogne. Complete catheter-life for 14 years, during which he had repeated attacks of cystitis and hæmaturia. Much difficulty in introducing the catheter, which latterly he had to use every half-hour night and day. A specially long catheter was necessary, from 14 to 16 inches being introduced before the urine flowed. The urine was putrid from pus and blood, and the patient was emaciated and in great agony. As Dr. Philip wrote, "It was only his fine constitution that enabled him at his age to survive a period of martyrdom which was increasing in severity." The prostate felt enormously enlarged per rectum, and the kidneys were tender and probably much affected.

On September 6, 1901, with Mr. W. Braine as anæsthetist,

PLATE LXX.

Fig. 1. *Enormous Prostate, weighing* 10¼ *ounces, removed from patient aged* 75; *exact size. The Catheter indicates position occupied by urethra.*

**Portion A A' B B' lay in bladder; that, B B' C C', outside bladder, between pubic arch and rectum. C, C', anterior aspect lying against triangular ligament.**

## PLATE LXXI.

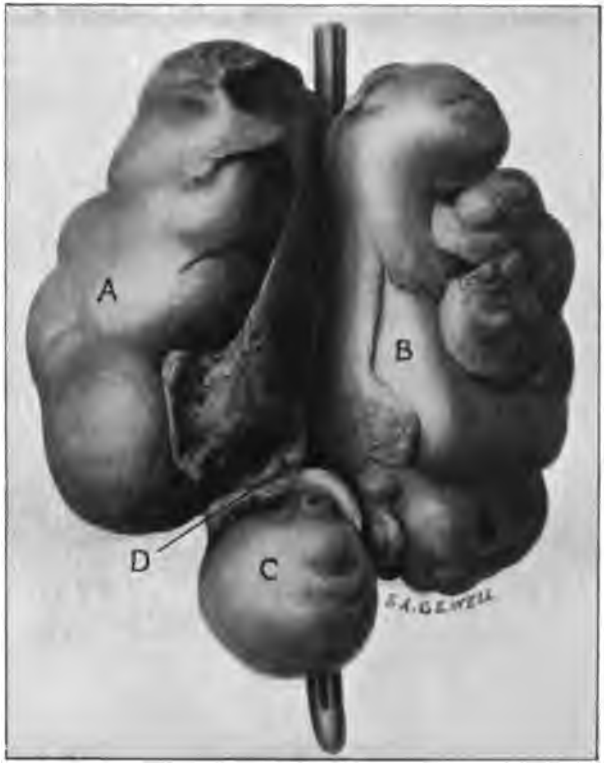


Fig. 2. *Prostate, weighing* $3\frac{1}{4}$ *ounces, removed from patient aged* 76 ; *exact size. Catheter shows position occupied by urethra.*

A, B, Lateral lobes; C, so-called "middle lobe," being an outgrowth from A.

I removed the entire prostate (Fig. 1) in its capsule in the manner already described. The operation lasted half an hour, the patient being three-quarters of an hour under the anæsthetic. There was no collapse, and on waking from the anæsthetic the patient began to laugh and joke. The temperature never rose above 100° F., and remained normal after September 12. Six ounces of urine passed naturally on October 7, and the wound had closed by October 17. On November 3 he returned to France. In September 1902, a year after the operation, I spent a day with him in France; he was then in excellent health, and as fine a man of his age as one could meet. On April 14, 1903, he wrote: "I am perfectly well with regard to my bladder and suffer no pain or inconvenience from it, and pass my urine as well as I ever did before the prostate troubles."

The prostate (Fig. 1) is an enormous one, weighing 10½ ounces. This is the largest specimen which I have removed.

*Case* 6.—A gentleman, aged 76, sent by Dr. Frood of Tapsham, Devon. He had employed a catheter for 13 years; complete catheter-life had lasted for 3½ years. He had great pain, hæmaturia, and difficulty in introducing the catheter, in consequence of which he used to leave it in the bladder all night. He was extremely feeble, and worn to a skeleton from continued suffering. The urine was putrid, containing much pus and blood. The prostate was felt to be greatly enlarged per rectum, and a stone was detected on sounding.

The patient was so weak that I feared to undertake any cutting operation, so I removed the stone — a hard urate calculus, weighing 508 grains—by litholapaxy on September 7, 1901. A good recovery ensued, but urine was still entirely passed by catheter.

As this gentleman was most insistent on having his prostate removed and willing to undergo any risk attaching thereto, and as his general health had much improved since the litholapaxy, I operated on October 10, 1901. I found a well-marked prominence of the left lobe (Fig. 2, C) projecting into the bladder and acting as a ball-valve to the orifice. The two lobes were detached along both commissures and came away separately. The patient made an excellent recovery, urine passing naturally on October 29, and the wound

being firmly closed by November 14. On his return home Dr. Frood wrote: "The operation has been a magnificent success. My hopes and anticipations from reading your lecture in the *British Medical Journal* have been fully realised." I have heard from this patient recently. He is in excellent health—a stone heavier than he ever was before the operation—and can pass and retain urine quite naturally. The prostate (Fig. 2) weighs 3¼ ounces.

In my first seven cases of this operation the prostate was removed entire in its capsule, leaving the urethra behind intact. I now pass on to the eighth case, which presents a peculiarity of far-reaching consequence in the development of the operation; for, though in the removal of the prostate as a whole the urethra was torn across, no untoward result ensued, the patient making a thorough recovery.

*Case* 8.—This patient, aged 65, had a history of prostatic symptoms for 10 years, much aggravated during the last 2½ years, particularly as the introduction of the catheter caused hæmorrhage. The prostate was felt to be greatly enlarged per rectum, tense, elastic, smooth, globular, and quite movable. Cystoscopic examination revealed an irregular bulging into the bladder all round its neck.

On December 11, 1901, I operated. After enucleating the prostate in its capsule from the sheath all round, I felt the catheter passing through its axis (the urethra), and that the lobes had not separated either along the upper or lower commissures. Passing my finger along the upper commissure, counterpressure being made by the finger in the rectum, I endeavoured to separate the lobes, when suddenly the whole mass was propelled into the bladder. The urethra was then felt covering the catheter, but severed at its vesical end. On examination of the prostate (Fig. 3) after removal I found that it was pear-shaped, and that it had been drawn off the urethra, which was severed at the neck of the bladder, just as a bead is drawn off a string. There was more hæmorrhage and shock than in the previous cases, but the patient made a thorough recovery.

Nine months after the operation I had the pleasure of showing this gentleman at the East Anglian branch of the British Medical Association. He was in perfect health, able to

## PLATE LXXII.

Fig. 3. *Pear-shaped Prostate, weighing 3 ounces, removed from patient aged 65.*

A, A', Stumps of displaced ejaculatory ducts, which were torn off; B, pubo-prostatic ligament; C, upper line of demarcation between the lateral lobes.

pass and retain his urine as well as he ever did; and recently I have seen him in excellent health, untroubled by any urinary symptom.

The success that attended this case, in which the urethra was undesignedly severed, emboldened me to tear the urethra across deliberately, and even to remove a portion or the whole of the prostatic urethra with the prostate; and I have found that this can be done with impunity and with the happiest results. The instances in which this procedure becomes necessary are those in which the enlargement of the prostate has not sufficiently advanced to loosen and define the lobes along their superior or inferior commissure; when the urethra is stoutly adherent to the lobes as a consequence of previous inflammation; and when, through inflammatory changes, the capsule and sheath are so adherent that they cannot be separated throughout their entire extent. In these latter cases I have removed not only the entire prostate with its capsule, but also a thin band of the sheath, or recto-vesical fascia, outside this, with perfect success, as the following example will illustrate.

*Case 28.*—On November 16, 1902, I was summoned to Stockport to see a gentleman in consultation with Dr. Hyde Marriott of that place and Mr. Southam of Manchester. Prostatic symptoms had been present for 7 years, the catheters being used from two to four times daily for 5 years; latterly this was attended by much difficulty of introduction and hæmorrhage. He had had retention in Brussels in the previous summer, when 26 ozs. of urine were drawn off by a Belgian surgeon; subsequently profuse hæmorrhage had occurred, necessitating the tying in of a catheter for four days, when the patient's life was despaired of. Latterly the bleeding had increased in frequency, and when I saw him in consultation he was confined to bed from weakness caused thereby. I passed a *coudée* No. 8, and drew off 8 ozs. of blood-stained urine containing pus and mucus. On sounding the bladder no stone was detected. The prostate was felt to be greatly enlarged per rectum, bilobed, smooth, tense, soft, and movable. In consultation it was decided that the case was one suitable for removal of the prostate, the only drawback being that the patient was very stout.

On December 4 he was sufficiently strong to travel to London. On December 8 I removed the prostate, Major S. F. Freyer and Dr. Marriott assisting. The prostate came away entire, together with a thin layer of the recto-vesical fascia or sheath outside it, which was adherent from old-standing inflammation. The prostatic urethra was also removed. Nine minutes elapsed from taking the knife in hand to open the bladder suprapubically till the prostate was delivered from the bladder. Some urine passed naturally on December 20, and was entirely passed by this channel on December 24, after which the suprapubic wound did not reopen, and convalescence was established without rise of temperature. The only interruption to his progress was an attack of biliary colic with jaundice, for which he was seen by Sir Thomas Barlow with me; this gradually subsided. After January 3 the patient walked out daily, and on January 8 he went home to Stockport, able to pass and retain his urine naturally. I heard from him on April 20, when he was in excellent health, actively engaged in his business. The prostate (Fig. 4) weighs 5¼ ozs.

There are numerous questions of interest connected with this operation which the limits of this article will not permit of my entering into, such as the all-important subject of the detailed after-treatment; how continuity between the bladder and urethra is established when the prostatic urethra is torn or removed; why it is that, though the bladder is septic beforehand in most of the cases operated on, they do not suffer from septicæmia, notwithstanding the extensive nature of the wounds; the establishment of the fact that, in spite of all previously-conceived theories and tenets, the bladder invariably regained complete control over micturition after that power had been entirely lost for periods varying from a few months to 24 years; the classification of cases in which this operation is advisable. These and other allied questions I may, with the kind permission of the Editor, return to on a future occasion.

In conclusion, I have now performed this operation on 45 patients, varying in age from 57 to 79 years—the average age being 67½ years—the prostates weighing from ¾ to 10¼ ounces, with an average weight of 3¼ ounces. All of them had entered on catheter-life, and in all save a few of them this catheter-life had been complete for periods varying from a

## Plate LXXIII.

Fig. 4. *Prostate, weighing* $5\frac{1}{4}$ *ounces, removed from patient aged* 63 ; *actual size.*

A A', B B', Lateral lobes covered by thin true capsule, and encircled by a thin band of recto-vesical fascia, C, removed with the prostate.

few months to 24 years. All were in broken health and many moribund before operation. Scarcely any of them were free from one or more grave complications, such as putrid cystitis, pyelitis, kidney-disease, diabetes, heart-disease, chronic bronchitis, asthma, &c. Of these, 40 cases have been successful, both immediately and remotely; and when I speak of success I mean an absolute and complete success—the patients being able to retain and pass their urine as well as they ever did. In no case has there been a relapse. Time only seems to consolidate their cures. There have been 5 deaths amongst these cases—namely, 2 died from acute mania after the wounds had practically healed and urine was passed naturally; 1 died suddenly from heat-stroke on the tenth day, when he was quite convalescent; 1 from coma, due to retention of morbid products of the urine, which had set in before the operation; and 1 from pneumonia seven days after the operation. Though these deaths are accepted in connection with the operation, in one instance only can the fatal result be possibly attributed thereto. Acute mania is an occurrence which, in my experience, is particularly prone to occur in aged males suffering from prostatic disease, whether subjected to an operation of any kind or in connection with catheter-life. This operation is comparable to none other in surgery, owing to the advanced age to which it is necessarily confined, and the broken-down constitutions of the patients, as a rule; and in judging of the mortality connected therewith, we must not lose sight of the fact that patients of this age are particularly liable to be carried off during the after-treatment and convalescence by disease, apart altogether from the operation. Under the circumstances I submit that the results of this operation are remarkable. They are far beyond anything I could have hoped for. I think I shall not be accused of exaggeration when I state that all previous so-called methods of radical cure of enlarged prostate are unsatisfactory, and that catheterism, though hitherto the least objectionable mode of treatment in the majority of cases, is liable sooner or later to terminate in cystitis or other dangerous complication. I submit that the successful results obtained in these cases of total extirpation of the prostate encourage us in the hope that we have at last arrived at a rational and practical method of dealing with this painful and fatal malady.

# VASCULAR AND TOXIC ACROPARÆSTHESIA, OR SENSORY DISTURBANCES OF THE EXTREMITIES OCCURRING INDEPENDENTLY OF PRIMARY DISORDER OF THE NERVOUS SYSTEM.

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[With Plate LXXIV.]

THERE seems to be very good reason for the use of the term acroparæsthesia, first introduced by Schultze,[1] as a comparatively convenient word indicating certain sensory disturbances met with in the extremities. Though in its original application it was not used to include all the cases in which such disturbances occur, it is becoming more and more recognised that some such term, in a broad sense, should be used in reference to a group of conditions in which numbness, formication, pain, &c., are met with in the hands and feet. Such symptoms are frequently observed in the early stages of peripheral neuritis, such as follows alcoholic poisoning; but there is a very large group of cases in which no such change in the nerves or in the central nervous system has been demonstrated, and it is to these cases alone that attention is specially drawn in the present paper. It is most important that more attention should be given to a consideration of these cases, since the symptoms are not only very common, but they cause much suffering, they may herald the onset of grave constitutional disturbance, and finally they are so little understood.

It is not proposed to bring into consideration in this article cases of so-called functional nervous disease, *e.g.*, cases of hysteria or neurasthenia. These disorders are as rigidly as possible excluded from examination. Although in the group of affections to be presently considered no nervous lesions have been satisfactorily demonstrated as the constant primary cause of the symptoms, yet other morbid changes are to be met with. In some cases, it is true, these give but an incomplete idea of the pathogeny of the particular affection; but in others by means of the direct and indirect help of analogy and

experiment, we are enabled to arrive at conclusions which leave little room for doubt as to the mode of genesis of the symptoms and signs.

In order to illustrate the nature of the difficulties met with in diagnosis a brief account may be given of a few cases, which will at once appeal to the reader, not only because of the frequency with which they occur, but also because of our ignorance of their causes, and—as a result of this latter—of the unsatisfactory treatment which alone we can offer. Many such cases have been reported in the medical literature of the last forty years, but little has been done yet to help the general practitioner or student of medicine to appreciate the more recent ideas on the subject of such cases, which too often are described as examples of "irregular gout," "goutiness," "rheumatism," "neuritis," "sciatica," or "post-influenzal debility." Indeed, very often such a diagnosis is suggested by the patient concerned, and, in our ignorance, we can but admit the possibility of the correctness of the supposition.

*Case* 1.—A lady, over 70 years of age, suffers for several months of the year—mostly the colder ones, but not necessarily so—from occasional severe stabbing pains in the soles of the feet, in the toes and fingers, and about the head. These pains are sometimes so severe that sleep is impossible. The pains come on during the day, and are so disturbing that this patient must perforce walk about in order to get relief. There is no sign of nervous disease; hyperalgesia of the affected parts alone is evident. There is, however, widespread arterial degeneration: the aortic second sound is ringing in character, and the digestive functions are badly performed. These pains, as well as certain cramp-like sensations in the lower extremities, have been treated as neuralgic or rheumatic.

*Case* 2.—A stationer's assistant, æt. 51 years, came to University College Hospital complaining of "rheumatism" in the forefinger of the left hand, dating from an attack of influenza fifteen months previously. Besides pain he had had numbness in the same finger, which both to himself and to the observer was cold. Occasionally the same symptoms occurred in the middle finger of the same hand and in the neighbourhood of the right elbow. His immediate anxiety was that he feared he had writer's cramp beginning in the left

hand, and that it would eventually spread to the right. He had been an abstainer for thirty years; there was no family history of gout, nor did he reveal any signs of this disease. The left forefinger and the whole of the left hand were smaller than the right; there was no wasting of the muscles of the left hand, nor was there any sensory loss, nor change in the colour of the skin. The arteries, especially the temporal, were tortuous and thickened, and there was a little discomfort on pressure upon the left radial nerve. In all other respects the man was quite healthy. Five months later similar symptoms developed in the right hand and foot.

*Case* 3.—A miniature-painter, Italian by birth, aged 40 years, sought relief from pain and numbness in the index and ring fingers of the right hand. The symptoms had been getting worse for four months; they were not constantly present nor were they increased or excited on all occasions by the pursuit of his calling. Often the pain occurred at five in the morning and prevented further sleep; the pains would last all day and render work impossible. He had had syphilis, but showed no signs of present disease. The affected fingers were quite free from objective signs of sensory loss; there were slight weakness of the right hand, tremor, and hyperalgesia; there were no signs of arterial or digestive disturbances.

*Case* 4.—A lady-clerk, aged 35 years, had for some months been troubled with numbness and tingling coming on simultaneously in both thumbs and both forefingers; the affected digits were swollen, but did not pit on pressure. So severe were the symptoms that the patient was unable to carry on her secretarial duties. Lately, the symptoms have appeared in the toes, especially those of the right foot, and the fingers and thumbs have shown no improvement. Beyond frequent attacks of vomiting, epigastric pain, flatulence, and other symptoms of gastric disorder, the patient is quite healthy. There is hyperalgesia of the affected digits, swelling of the fingers, and very marked thickening of the skin at the ends of the thumbs and forefingers. The nails show a very marked transverse ridge, and the thumb-nails are very smooth and shining. Sensation is blunted, but not lost, over the affected digits.

*Case* 5.—A married woman, aged 52 years, complains of

pains in the hands lasting six weeks; they are worse at night, and, to use her own words, are such as would be produced by "sticking red-hot wires" into the fingers. Occasionally the symptom has abated entirely. She had had three or four similar attacks previously, the last one two years ago. She is generally costive, and is troubled with flatulence and discomfort after eating food. Hyperalgesia was present in both hands, and the forefinger of the left hand was swollen and somewhat blue. There was no other sign of sensory or other disturbance.

Cases such as these are common in out-patient practice, occurring mostly in women from 40 to 55 years of age; in one case the symptoms are aggravated by work at the "wash-tub," and in another case similar symptoms are complained of in both hands and feet. Most of these cases show symptoms of dyspepsia, such as impaired appetite, nausea, flatulence, &c.

*Case* 6.—A labouring man returning from work partook heartily of a dish of shell-fish: he then resumed his journey, but about twenty-five minutes later he felt faint and nauseated; and became so ill that he was brought by the police to the casualty-room of University College Hospital. He looked very ill, but was able to give an account of his illness, and he mentioned that he had also severe numbness and tingling of both hands and forearms; his hands felt stiff and swollen. No sensory loss could be discovered in the affected parts. Apomorphine was administered, and the stomach evacuated of a very large quantity of mussels. Within a few minutes the sensory symptoms in the upper extremities had quite disappeared, and within half an hour the faintness passed off, and he was able to go home.

The cases referred to so far were not serious ones, though in some the symptoms were sufficiently severe to cause considerable inconvenience: they proved, however, most difficult to treat. The following cases are of greater interest because of the very grave disorders to which the symptoms were due, and because opportunity presented itself of demonstrating them.

*Case* 7.—A young man, of about 30 years of age, complained of very severe numbness and tingling in both hands, which had existed for several days, and were growing progressively worse. He volunteered no other complaint, but on

being cross-examined admitted that he had not been feeling very well lately. Obvious puffiness of the lower eyelids led to an examination of his urine, and a dense cloud of albumen was found. There were no objective signs discoverable in the hands suggestive of neuritis, nor any other signs of disease beyond the albuminuria. He was admitted to the wards of University College Hospital, and within ten days died of uræmic coma; besides the presence of renal disease nothing more was revealed by the autopsy.

*Case* 8.—A married woman, aged about 40 years, presented herself at the Brompton Hospital for Consumption, complaining that she had steadily lost flesh for six years, and often felt unequal to performing her duties as a charwoman. No other symptoms suggestive of lung-disease were mentioned, nor were any signs found in the chest. She complained, however, of nausea, and on examination of the abdomen, the stomach was found to be greatly enlarged, and lying in the suprapubic region. During the manipulation of the organ, peristalsis became visible, the patient turned faint, and complained of feeling sick. She now, for the first time, recalled curious attacks of numbness and tingling in the hands which were always present during her attacks of nausea, and which passed off after she had vomited; numbness and tingling occurred on the present occasion, reminding her of her previous attacks. She was admitted to University College Hospital, and laparotomy was performed by Mr. Raymond Johnson. The stomach was found to be very much enlarged and displaced, but no obvious obstruction was found at the pylorus; there was some thickening of the stomach-wall at one spot, suggestive of the cicatrix of an antecedent ulcer. Posterior gastro-enterostomy was performed, and the patient made an uninterrupted recovery. She was entirely relieved of her symptoms, and gained flesh rapidly.

*Case* 9.—Finally, a woman, aged 60 years, was admitted to University College Hospital for the relief of a strangulated hernia. She had been ill for five days; and besides the vomiting and local symptoms, she had had "numb feelings" in the fingers of both hands, and also cramps in the arms and legs. The hernia was operated upon, and a fæcal fistula established. All went well till the latter part of the next day, when she experienced cramp-like pains in all four

extremities ; there was also occasional twitching of the facial muscles. The knee-jerks could not be obtained. There was well-marked facial irritability, *i.e.*, tapping the facial muscles with the finger caused a contraction of them (Chvosteck's sign) ; Trousseau's sign could not, however, be elicited. Spasm was present in the recti abdominis muscles and also in the face, and there was stiffness of the neck. The hands were a little swollen and blue, and the face was flushed. As the stomach-note reached a considerable height into the left axilla, lavage was performed, but no relief of the symptoms ensued; and she died on the fourth day after the operation, the pulse becoming very feeble and intermittent. At the autopsy the stomach did not appear to be greatly dilated ; a second part of the bowel was found gangrenous, and had apparently been caught in the hernial sac and liberated prior to the operation for the relief of the portion which was found in the hernial sac.

Some of these cases, it will be noticed, are closely associated with gastric disturbance, and the last is obviously one of gastric tetany; but in others considerable difficulty will be felt in giving a correct diagnosis. Other cases have come under observation in which the sensory disturbances of the extremities have occurred in association with other symptoms and signs characteristic of disorders to which more or less definite names have been applied. In the winter season of the year cases of Raynaud's disease are frequently discovered, a considerable number being found in patients who have complained of some other symptoms, and have not noticed the changes in the hands indicative of this disorder, though they may complain of chilblains. Carpopedal contractions and tetany in infants are also commonly seen associated with rickets and gastro-intestinal disorder. During the last few years several cases have been admitted to University College Hospital for erythromelalgia. Tetany is not unknown in typhoid fever; and in a case recently under treatment for the latter disease at the same hospital, the symptom known as "tender toes" was so marked that the patient often cried with the pain.

*Comment.*—In considering the above cases, related with some brevity, and yet with that definition with which they

came under observation, several points of similarity are obvious in them all. The hands and feet were the special seats of disturbance; sometimes the affection was unilateral and attacked but one limb, in other cases it alternately involved all the extremities. The one common symptom was formication or tingling; in some there was very considerable pain, spontaneous or evoked by pressure; in most there was no anæsthesia; in one case only was there any blunting of sensation, and that was probably due to the thickening of the skin in the areas affected. In one case alone there was spasm of the muscles of the arms, legs, face, neck, and trunk; the remaining cases were free from this symptom. In no case was there any muscular wasting or paralysis, though in some "weakness" was complained of; in none were there convincing signs of neuritis in the proper sense of the term. So similar indeed are these cases in their main features that it is impossible not to think that in all there is one common *modus operandi* for the production of the symptoms, however different may be the primary causes of such phenomena.

Various theories, based upon clinical and therapeutic evidence, have been held for many years by various writers to explain the occurrence of these symptoms; and, beyond the introduction of rather cumbrous clinical terms to describe the more common forms of the disorder, very little has been done to place them on the more sure footing of pathological and experimental investigation. A beginning has been made from the experimental side, and this alone can prove to be complete and satisfactory; for opportunities for the examination of the tissues of patients suffering from the minor forms of sensory disturbance are rarely forthcoming. Some patients improve; while others pass from the mild to severe stages, when microscopical examination of the tissues affected cannot be said to reveal absolutely the cause of the antecedent minor disturbances.

Despite the hesitancy shown by many modern text-books to make use of the term "acroparæsthesia" for the description of the various sensory disturbances mentioned above as occurring in the extremities in various diseases, it must be admitted that there is very good reason for its introduction. As a symptom, or group of symptoms, the condition is definite

enough; and as for its significance and the importance of its detection and proper interpretation, the few brief accounts above given offer sufficient proof.

Nothnagel[2] was the first observer to recognise this symptom-group, and further observations were made by Putnam[3] of cases very similar in character. We are indebted to Schultze[1] for the introduction of the word "acroparæsthesia," to denote those sensory disturbances occurring in the arms or legs which are yet quite separate from symptoms due to organic nervous disease. More modern writers[4] have extended the term, and include under this heading all those disorders in which numbness, tingling, hyperalgesia, &c. are present, without reference to the cause. It is in this broad sense that the term is used in this contribution, but it is not proposed to discuss the group of disorders, evidenced by the presence of acroparæsthesia, which are dependent on primary nervous disease. Acroparæsthesia is present in the early stages of certain forms of "multiple neuritis," such as alcoholic neuritis; and though we are not yet in full possession of all the facts relating to the mode of production of the neuritis, or of the actual toxic agent, yet it is fully admitted that in such cases the nerves themselves are the first and only anatomical element to be attacked.

There then remains a large group of other maladies in which acroparæsthesia is present, and yet primary nerve-disorder is probably not the cause; in these we must look to disturbance of other structures, such as the blood-vessels, to find a satisfactory explanation. In many of these cases, changes have been discovered in the walls of both arteries and veins, and thrombosis has also been shown, the nerves and their endings being either quite normal or only secondarily and slightly affected. In other cases no anatomical changes have been found in the vessels, and very slight and ambiguous changes discovered in the nervous system; while at the same time clinical and therapeutic evidence has established various theories of causation, the most plausible one being that of auto-intoxication. By some means or other poisonous material is manufactured within the body, and is capable of producing profound, though in many cases only temporary, disturbance of vasomotor control, associated with a secondary functional

or even organic disturbance of the nervous system. In other cases no evidence, so far, is forthcoming to explain the causation of the acroparæsthesia. We have thus three groups of diseases in which acroparæsthesia is a prominent symptom.

(1) Those disorders in which it is dependent upon local vascular disease, the commonest change being proliferation of the internal coat of the arteries, with or without thrombosis;

(2) Those disorders in which acroparæsthesia is dependent upon a toxic agent, produced within the body or introduced from without, which is capable of causing vasomotor disturbances, the vessel-walls remaining, for a long time at any rate, quite normal. Permanent changes may or may not occur in the nerves, but these are secondary in all instances. In some cases these two groups are combined, so that we are able to understand those cases in which acroparæsthesia occurs in one limb only, under the influence of a toxic agent, which should produce symmetrical disorder if acting upon vessels similar in condition. It is, however, common knowledge that in many cases endarteritis is found more in one extremity than in another, and the variable and irregular distribution of atheroma still puzzles pathologists;

(3) A third group still remains in which, from want of more pathological and experimental observations, we are still unable to assign a cause of the acroparæsthesia: such cases may be called "Idiopathic."

## I.—VASCULAR ACROPARÆSTHESIA.

This term will serve as a brief description of the first group of cases.

a. *Schultze's Acroparæsthesia.*—In these cases numbness and tingling are complained of, while objectively only hyperalgesia is to be made out. The symptoms may be continuous or intermittent; they may be acute, sub-acute, or chronic in course (Friedmann).[5] Anæmic, overworked adults in middle life are affected, especially women at the menopause, or those who obtain a living by "washing." Erb[6] includes under this title those cases in which vasomotor disturbances are also present, *e.g.*, the affected part may be pale or blue, mottled with red patches. Such cases had been described by Erb[7] and Moebius[8] as cases of "akinesia algera"; but though Schultze

does not include vasomotor disturbances as an element in the diagnosis, there can be no valid reason for such exclusion. Schultze's acroparæsthesia may occur in patients who have some other affection, but probably these are mere coïncidences, and much more often acroparæsthesia is the only complaint. Savill[9] found that out of thirty-five cases, 82·8 per cent. were in women; in ten of his cases some other affection, such as hysteria, neurasthenia, or general paralysis, was present, whilst in the remainder there was no other disease. The case of the miniature-painter reported above might well belong to this category, especially as the syphilitic poison may have caused local arterial changes in the smaller vessels of the affected fingers. Considerable variation is, however, met with in the various cases described in which acroparæsthesia is present; as mentioned already, Schultze's description applies to those cases alone in which there is sensory disturbance. Haskovec,[10] however, refers to cases described by Rosenbach,[11] in which sensory disturbances were associated with vasomotor changes and even with affections of the joints of the fingers. Nothnagel's original cases showed vasomotor changes first and sensory changes afterwards. All these minute subdivisions are most unnecessary; for not only do they cause endless difficulty in diagnosis, but they have the great defect, that they are not based upon any sound pathological difference. Cases almost identical have been described by other writers, who, however, have not ventured to name the disorder.[12] It is interesting to observe how differently these affections have been named by different observers. Ormerod mentions that in one of the cases described by him (No. 4) the diagnosis of "writer's cramp" had been made; and the similarity of this affection to tetany has also been noted by the same writer, by Friedmann,[5] and by Schmidt.[4]

The question now arises, what are the justifications for considering such cases as dependent upon local organic vascular disease? No observations have been published dealing with the morbid anatomy of the vessels and nerves in these cases, but from the facts that similar symptoms are met with in erythromelalgia, in which local vascular disease is the most common change found, and that in many cases other evidence can be found of arterial disease, we may assume that in some

cases acroparæsthesia may be entirely dependent upon local vascular disease. The fact that this symptom is so often met with in individuals in whom arterial disease has been demonstrated, is also corroborative; thus, acroparæsthesia has been noticed in chronic alcoholism, in diabetes mellitus (Friedmann[8]), and in renal disease (Senator,[13] Alibert,[14] Dieulafoy,[15] and Schmidt[4]). The second case reported above is probably an example of this form of disorder, and the accompanying wasting of the left hand and left forefinger may readily be explained on the same grounds as the wasting of any tissue or organ when its arterial supply is interfered with. Probably most physicians have been guilty at one time or another of diagnosing "gouty" sciatica or "gouty" neuralgia or "gouty" megrim in cases in which there are really no signs of gout whatever. Descriptions of "irregular gout" and "goutiness" are met with in many text-books, but so far as can be ascertained there is no direct proof that such disorders are due to gout. The fact that similar symptoms occur in patients who also have gout is of course quoted in support of this view, but it must also be admitted that in gout there is also a very great tendency to arteriosclerosis, and it is probable that this is the factor which accounts for much that is known as "goutiness" in patients who have never had any of the undoubted signs of gout. It is very probable that the painful cramps in the calves of the legs occurring especially at night, as met with in Case 1, are due to the arteriosclerosis with which this patient is afflicted. Erb speaks of the "gouty" pains met with in the soles of the feet, but freely admits that there is no justification for the diagnosis of a "gouty" diathesis. Sir Dyce Duckworth[16] in his lectures on gout also refers to the hot, itching feet met with in gout. "Tarsalgia," "Achillodynia" and "Podalgia" (Bernhardt[17]), and the "gouty" finger described by Pfeiffer,[18] are all probably of the same nature—not really dependent upon the poison of gout, but rather upon vascular disease. Thoma[19] has very little doubt that megrim, neuralgia, and rheumatic muscular or "tendon" pains are due to arteriosclerosis or, as he prefers to call it, angiosclerosis.

There is, however, some other agent at work, for, if arteriosclerosis were the only morbid change, it would be difficult to explain the intermissions of the symptoms. This

is readily explained by the effect produced by cold in further constricting vessels which are already narrowed by disease; hence the acroparæsthesia of washerwomen, and the "muscular rheumatism" or rheumatism of the aged, or neuralgias produced by chills or sudden changes of temperature. No doubt, too, that in cases of migraine some such exciting cause as gastric disturbance may produce an additional constrictive effect upon vessels already diseased, sufficient to produce various mental and sensory disturbances,

b. *Raynaud's Disease.* — Under this title three separate forms of disorder have been described and are familiar to all physicians, especially in the winter months. In the "syncopal" form, pallor of the affected fingers of one or both hands is met with; as a general rule sensory disturbances are not very evident, and the disease is rarely painful; in some cases there are various paræsthesiæ. In the "asphyxial" form, pallor of the affected parts is replaced by lividity and blueness, and coldness and clamminess may be complained of. Here, too, pain is the exception, but paræsthesia is common. In extreme cases gangrene occurs often with a bilateral distribution, and hence the name given to this third form of Raynaud's disease, viz., "Symmetrical gangrene." No hard-and-fast lines can be drawn between these several maladies; one form may supervene upon the other, or different forms may occur in different extremities simultaneously. Amputation has been performed in cases of symmetrical gangrene, but no changes have been found in the nerves: in nearly all cases vascular changes have been found. Accounts of the morbid anatomy of the "syncopal" and "asphyxial" forms are very scanty; and, so far as can be gathered from the literature, are limited to the account given by West.[20] In this case no vascular or nervous change could be demonstrated, but no mention is made of examination of the minuter vessels and nerve-endings, &c. In the absence of histological evidence, theoretical arguments have been advanced to support the view that the disorder is due to vasomotor disturbances occurring in storms, sometimes of short, sometimes of long duration; and the seat of disturbance has been placed in the central or peripheral nervous system, according as observers have met with such disturbances occurring by themselves or associated with

grave central nervous disease. The close similarity existing between this disorder and others, for example, simple acroparæsthesia, encourages the belief that the symptoms are due largely to some permanent or temporary occlusion of vessels. Given some slight thickening of the coats of the smaller arteries, especially the internal coat, such additional factors as cold or digestive disturbance are particularly liable to establish and maintain the onset of one or other form of Raynaud's disease. A patient at present under observation, in whom there is every reason to think that the menopause is occurring, has the "asphyxial" form of Raynaud's disease in the right hand, and the "syncopal" form in the left: in addition she is severely afflicted with vasomotor disturbances and flushes very readily, and is a martyr to obstinate dyspepsia and constipation. All these symptoms are closely associated with the period of irregularity of the catamenia.

c. *Erythromelalgia.*—This term was introduced by Weir Mitchell[21] to distinguish a group of cases in which acroparæsthesia of the extremities is associated with vasomotor disturbances very much like those met with in Raynaud's "asphyxial" form, but in which, in addition, pain is a very prominent symptom. Even considerable swelling may occur in the extremities, and trophic disturbance of the skin and nails is not uncommon. Elevation of the affected part or exposure to cold is often followed by relief from the pain.

Notwithstanding the large and increasing number of cases which have been reported, very little light has been thrown upon the causation of the malady; while, as in the case of acroparæsthesia and Raynaud's disease, all observers do not agree that the particular group of symptoms deserves a special title. Many cases present anomalous characters, and are not like the complete picture described by Weir Mitchell. Cases are reported which begin as cases of simple acroparæsthesia; or they may begin as frank cases of erythromelalgia, and end as cases of gangrene; or they may combine many of the characters of Raynaud's disease.[22]

Of the cases of erythromelalgia,[23] in which histological examination has been made of the affected extremity after amputation, or of the nerves excised for relief of the pain, in two only are changes recorded in the peripheral nerves, viz.,

in one of Weir Mitchell's[24] cases and in the case reported by Sachs and Wiener.[25] In each of these cases there was some reduction in the number of fibrils of the nerves removed, and some increase of the interstitial tissue. Weir Mitchell considered this to be the primary change, and the marked arterial disease, which accompanied the change in the nerves, as secondary. Sachs and Wiener, however, considered that the vascular disease in their case was greatly in excess of the change in the nerves, and was therefore probably the primary disorder. The remaining eight cases showed no changes in the nerves. In three cases examined by myself (*l. c.*) there was no change in the final terminations of the nerves or in the larger trunks, but vascular changes, especially in the intima of the arteries, and venous thrombosis were well marked. Anæsthesia is not a characteristic of erythromelalgia, nor was it present in Weir Mitchell's case, despite the fact that but a few nerve-fibrils were present in the fibrous cord which represented the nerve distributed to the affected great toe. In erythromelalgia, as in other forms of sensory disturbance of the extremities, occurring alone or with trophic, vasomotor, or motor derangement, considerable difficulty has been met with in explaining the symptoms without charging them primarily to the nerves. Nothnagel,[26] Laache,[27] and Thoma have, however, demonstrated the existence of Pacinian corpuscles in the adventitia of arteries, and have also shown that it is possible for alterations affecting the arterial coats to cause pain by the involvement of these structures. Schlesinger,[28] quoted by Sternberg,[29] explains the pain by the obliteration of the vasa vasorum; Sternberg was, however, unable to demonstrate this. Erb says it is common for circulatory disturbances to cause pain by interfering with the proper action of the sensory nerve-apparatus of the skin, and is convinced that simple obliterating arterial disease is responsible for all the disturbances met with; because, in senile and spontaneous gangrene, the disease of the vessels is unaccompanied by disease of the nerves. In the condition known as "intermittent lameness" vascular disease is found, and the "lameness" may be associated with vasomotor or sensory disturbance: the occlusion, more or less complete, of the arteries supplying blood to the nerves which control

the latter function is shared by vessels supplying the muscles, and this occlusion is followed by "lameness," or "cramp." Even if nerve-changes are found associated with arterial disease, it is more than probable that the latter is primary; and Schlesinger[38] has described an "angiosclerotic" neuritis associated with and following upon vascular disease.

Seeing that the "syncopal" and "asphyxial" forms of Raynaud's disease may eventually assume all the characters of erythromelalgia, and that in a very large proportion of cases of the latter disease examined microscopically there were no evidences of nervous affection, while vascular disease was constant, it is almost certain that Raynaud's disease, in its slighter forms, is not dependent upon primary nervous disease, but upon some functional or organic vascular disorder, possibly in some cases upon both. As to the gangrenous form of Raynaud's disease, it has so much in common with spontaneous or senile gangrene, associated with angiosclerosis —using Thoma's term in preference to "obliterative arteritis"— that it is impossible to separate the two maladies from one another. Cases of this last type have been described by Friedländer, who introduced the term "obliterative arteritis," by Pearce Gould and others.

d. *Sclerodactyly.*—Yet one other condition remains to be considered. In this form of disorder, sclerodermia is localised to the digits more especially, but may involve a much larger part of the extremities. It is a symmetrical and progressive affection, in which the affected digits are red or blue, and the skin hard, swollen, and cold; there is usually no pain or paræsthesia. It occurs frequently in children. In the large majority of cases alterations are found in the blood-vessels. The fourth case described above would appear to have some features in common both with this form of disease and with simple acroparæsthesia (*cf.* Putnam's second case). Raynaud also noted thickening of the skin in some of his cases, and keratosis and erythromelalgia have been described by Reynolds[39] in his series of observations of arsenical poisoning at Manchester.

With reference to the swelling met with in various forms of sensory disturbances of the hands, it is common knowledge that certain individuals after a prolonged walk feel that their hands are swollen and stiff, and yet no cardiac or renal disease

can be discovered, and no anæmia. It is quite possible that in such individuals the vascular system is not as perfect as it should be, and the dependent position, and absence of vigorous use of the arms under such conditions may be instrumental in retarding the proper circulation of blood through them. This defect will be specially marked in the distal portions—the hand and fingers.

So far, various maladies have been discussed in which vascular disease is the primary lesion. In some forms of disorder, as in acroparæsthesia and the milder forms of Raynaud's disease, evidence is entirely wanting that there is any vascular change other than a functional one; but this may be because the necessary enquiries have not yet been carried out. Relying upon the similarity to other conditions in which vascular changes have been discovered, it would seem that, in both these affections, the possibility of vascular disease is manifest. No doubt there are many toxic substances which, by prolonged action upon the vessels, eventually produce permanent changes in their walls; and instances of this influence are common in the literature of the subject. Only quite recently Rooth[31] has described three cases occurring in patients suffering from enteric fever at about the third week: one was found to have the peculiar "tender toes" met with in typhoid fever, and the other two had œdema of the feet: four days later the latter two cases developed gangrene of the affected parts. Sensation at first was present in the skin, which was also hypersensitive, the feet being very painful: the other case also developed gangrene. Rooth was convinced that he was not dealing with Raynaud's disease (?), but with a disease of which arteritis was the probable cause. It may be assumed, at all events, that the poisons of typhoid fever had had something to do with the vascular change in all three cases, producing, in one patient only, the slight early symptoms of "tender toes."

## II.—SECONDARY OR TOXIC SENSORY DISTURBANCES OF THE EXTREMITIES.

There yet remains another group of disorders in which sensory disturbances are met with in the extremities. In a

somewhat arbitrary fashion these are discussed as distinct from the first group, but it will be noticed that in these latter cases the influence of a toxic body, actually demonstrable or almost so, is very clear. In the present state of our knowledge it is quite impossible to say whether the toxic agent alone is in operation, producing its effects by constricting or dilating the vessels, or whether it acts upon vessels which are primarily diseased: in most cases, at any rate, so far as clinical observation goes, there is no permanent vascular disease.

These may be quite simple in character and approximate closely to the description already given under the heading of vascular acroparæsthesia, so that there may be two forms of acroparæsthesia—primary vascular and primary toxic. In addition, acroparæsthesia may be followed by, or associated with, muscular spasms, tonic or clonic; and in some cases so severe is the intoxication that coma may ensue and cause death. Every degree of severity may be met with, from the the simple numbness and tingling of fingers and toes met with so often in chronic dyspepsia, the "tender toes" of typhoid fever, and the "irritability of the feet" frequently experienced by railway travellers, to grave manifestations like those met with in uræmia, in gastric tetany, or after the removal of the thyroid gland.

The most unsatisfactory aspect of the study of this group of disorders is the fact that, with but few exceptions, no investigations have been carried out to isolate the particular toxic body concerned. Ptomaine-poisoning has, however, been closely studied by Brieger[28] and others. In the case of auto-intoxication, it is supposed that in some instances the cells of certain glands undergo marked change and work more actively or less efficiently than they should do; in other cases, possibly, the cells of the body generally are at fault, and we are unable to fix the blame on any special group of cells. The same or very similar effects are produced by auto-intoxication as occur in ptomaine-poisoning, but we are almost entirely unacquainted with the specially active bodies. We can compare them with ptomaines; but so far, almost without exception, we are only made aware of their existence by the baneful effects which they produce, and by the effect of treatment, which may be able to remove them or prevent their formation.

Certain poisons, like ergot, afford much resemblance to these toxines. Cornutine is capable of producing symptoms of spasm, with cramps in the muscles and contraction, the arms being flexed and the legs and feet extended. Sphacelinic acid is credited with the power of producing gangrene in the fingers, toes, ears, and even nose. The earliest signs of ergot-poisoning are tingling sensations, muscular weakness, and slight fever. In the later stages there have been recorded epileptic seizures, delirium, melancholia, and death. Somewhat similar symptoms have been observed in poisoning by lathyrus and in pellagra. Mott and Halliburton[32] have shown that epileptiform seizures in general paralysis are closely associated with the liberation from the nervous system of neurin and cholin. Magnan[33] has shown that by the injection of absinthe into the circulation of carnivora typical epileptic fits can be produced. Chronic plumbism and chronic alcoholism are often revealed by epileptic seizures. Apparently, judging from Case 7 related above, uræmia may be ushered in by acroparæsthesia. Before paralytic symptoms are produced arsenic is capable of producing flushing and hyperæmia of the skin, puffiness of the eyelids, vomiting, and diarrhœa. In the Wellbeck[34] cases of food-poisoning, in addition to the general characters of gastro-intestinal irritation, the intoxication produced cramps in the legs and arms, spasms in the muscles of the hand and face, and tingling and other sensory disturbances in the extremities, with drowsiness, hallucinations, and fatal collapse. Poisoning by cheese or by mussels[35] is followed by very similar symptoms. Severe gastro-intestinal disorder occurring in rickety children is very liable to produce infantile tetany or carpopedal contractions, or even the hydrocephaloid state. Tetany and "tender toes" have been noted in typhoid fever. In gastric disorder, especially in those cases in which beer is freely drunk, acroparæsthesia is exceedingly common. A severer manifestation of acroparæsthesia associated with cramps, and often closely connected with gastric disorder, has been dignified with the name of gastric tetany, a condition which is very often fatal, as in Case 9, related above. Angio-neurotic œdema is frequently found associated with gastro-intestinal disorder, and Schlesinger[36] has met with it in one individual associated with erythromelalgia and Raynaud's disease. Ullmann[37] has

reported a case in which angio-neurotic œdema was followed by epileptiform attacks. Infantile eclampsia is very frequently associated with gastro-intestinal disturbance or with helminthiasis, and is so similar to epilepsy that it is quite a question whether these are not really cases of epilepsy. Further, epilepsy and various psychoses[38] have been noticed in cases of acroparæsthesia, Raynaud's disease, erythromelalgia, and tetany.[39] Uræmia itself frequently assumes an epileptiform manifestation. With respect to helminthiasis evidence is accumulating which tends to confirm the theory that various intestinal parasites produce toxic bodies which account for the occurrence of numbness, muscular pains, œdematous skin, as well as epilepsy and chorea, which have been observed in individuals affected with tænia, anchylostomum, or trichina. Dyspepsia is frequently associated with flushing of the face, and it is common in young women to meet with cases of so-called "toxic pseudo-angina," the pains reaching down to the fingers of one or both hands. Migraine may be accompanied by disturbances of sight, by numbness of the tongue, face, and hands; cramps, and vasomotor disturbances, dizziness, aphasia, and psychical disturbances occur, too, and, according to Liveing, there is much in a migrainous attack which is akin to epilepsy. In some cases of neuralgia, arteriosclerosis has been demonstrated in the temporal artery of the same side (Thoma[40]); in others the artery is felt to be hard and to become cord-like during the paroxysm, but relaxed in the interval. Neuralgia in general is well recognised clinically, but as to its immediate pathological associations we know little or nothing.

Recently, a clerk applied for relief from "writer's cramp" with which, according to his medical adviser, he was afflicted. He wrote slowly and clumsily; the pen was held in such a way that the end of the thumb was kept from apposition to the pen, the ball only being in contact owing to the pain when the end of the digit pressed against the pen. In addition, he was a heavy smoker and drinker. Dr. Poore[41] limits the term "craft palsy" to those cases in which cramp or muscular weakness occurs in certain muscles which are constantly in use, so that this case should not be included in the category of writer's cramp; treatment adapted to cure the patient's alcoholic

dyspepsia resulted in a disappearance of all acroparæsthesia. Osler, however, under the heading of "occupation neuroses," includes a variety of symptoms other than spasm and paresis, *e.g.*, abnormal sensations, including pain and hyperæsthesia, and vasomotor and trophic disturbances. Sievers[42] has gone so far as to use the term "occupation tetany" to describe such cases. Finally, there is no satisfactory explanation of the symptoms known as muscular rheumatism, sciatica, the pains of rheumatoid arthritis, and other similar affections.

## PATHOLOGY.

Before dealing with the pathology of such a varied group of disorders as those just noticed, it must be admitted that possibly all these affections are not dependent upon functional disorder of the blood-vessels, or even upon organic changes in them. True as this may be, every observer will admit that, despite the frequent invocation of "neuritis" as a cause of many of the conditions mentioned, the number of cases definitely proved to be due to this lesion is extremely small, so that the assumption that they are dependent upon vascular disturbance demands no more of us than the more popular and older theory.

Considering the frequency of the occurrence of the various disorders just considered, which clinically are just as deserving of the title acroparæsthesia as are the disorders discussed under the heading of "Sensory disturbances of the extremities primarily vascular in origin," it is very remarkable that we are so little acquainted with their mode of genesis, and with the morbid anatomy with which they are associated. Observations have indeed been made, but very frequently they have proved entirely negative, both with respect to the vessels and to the nerves; or, if changes have been found, the interpretation of them has been unsatisfactory. By the courtesy of Dr. Sidney Martin the accompanying microphotographs (Figs. 1, 2, and 3) are published for the first time; and, so far as I am aware, they are the only illustrations which have appeared dealing with the subject of tetany. The nerves were removed from a case of infantile tetany, and show obvious signs of "interrupted" degeneration. The "interrupted" character of the degeneration suggests that the changes may be due to toxic material

brought by the vasa nervorum. Schlesinger[43] has shown that the vascular occlusion met with in angiosclerosis is capable of producing an initial parenchymatous neuritis and a terminal fibrosis of the nerve-trunks. It has also been shown that disorder of nerves occurring as a primary lesion, and producing immediate dilatation of vessels, may be followed by changes in the intima of the arteries,[43, 44] the intimal thickening being an effort on the part of the tissues to restore the lumen of the vessel to its normal dimensions. The histological examination of the lesions in cases of erythromelalgia, as has been pointed out already, leads to the conclusion that extensive vascular disease may exist without any signs of parenchymatous change in the nerves. Most observers are of the opinion that it is more common for arterial change to be primary, and nerve-change, functional or organic, to be secondary, so that Dr. Martin's microscopical preparations do not require us to believe that tetany or any of the numerous other forms of acroparæsthesia is primarily a "neuritis."

There are but few other observations on the morbid anatomy of gastric tetany. Hoffmann[45] quotes Langhans, who made histological examination of the nervous system of a woman, æt. 48 years, who died of this disease; periarteritis and periphlebitis were found in the white commissure and anterior horns, especially of the cervical and lumbar enlargements of the cord. Schultze's criticism as to the frequency of such changes in all subjects of that age is a just one; but the absence in such other cases of the symptoms of tetany is explainable on the ground that a source of auto-intoxication from dilated stomach occurs only occasionally, and it is just in those cases of dilated stomach and arterial disease that gastric tetany manifests itself. Berger,[46] in another case of gastric tetany, found no changes of any kind. Weiss[46] found swellings of the cells of the posterior-root ganglia, and of the anterior horns of the grey matter, associated with vacuolation. Ferrannini[47] found changes in the motor cells of the nuclei of the medulla, and in the ganglionic cells of the cervical part of the cord of a patient who died of gastric tetany. In these latter cases there is no observation on the condition of the blood-vessels.

However, it is not at all necessary that any permanent

## PLATE LXXIV.

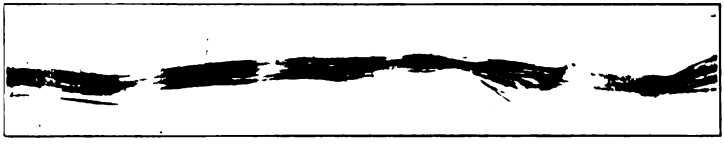

Fig. 1. *"Interrupted" degeneration of nerve to vastus internus from case of Infantile Tetany. (Osmic-acid preparation.)*

Fig. 2. *Higher magnification of area of "interrupted" degeneration from case of Infantile Tetany. (Osmic-acid preparation.)*

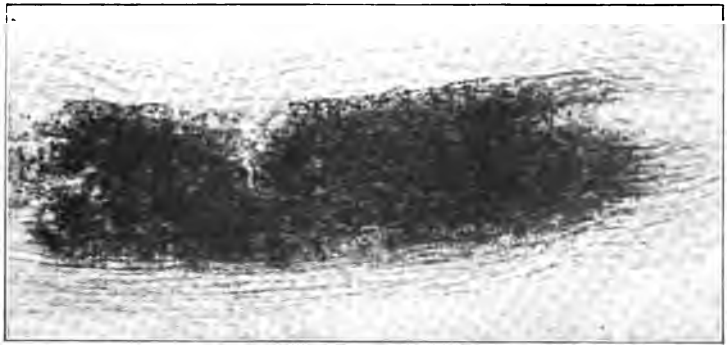

Fig. 3. *Muscle undergoing fatty degeneration as a result of the degeneration of the nerve supplying it. (Osmic-acid preparation.)*

**The above preparations were made by Dr. Sidney Martin, and my thanks are due to him for permission to make use of them as illustrations of this communication.**

changes should be found in the vessels, in order to explain the occurrence of this most interesting group of cases, for we need only invoke the aid of a toxic body or bodies to act locally and temporarily upon the vessels, either directly upon the muscular wall or upon the local nervous mechanism. As a result, contraction or dilatation of the vessels occurs, and paræsthesia is developed. Permanent sensory and vasomotor disturbances occur in erythromelalgia, and the only change found is one of vascular disease—endarteritis, thrombosis, and endophlebitis. But very similar sensory disturbances, accompanied by blueness and coldness of the extremities, occur in tetany, and the attacks may be intermittent. It seems, therefore, justifiable to conclude that the various sensory, vasomotor, motor, and trophic disturbances met with in this second group of toxic disorders of the extremities may be due to a transitory closure or expansion of blood-vessels, occurring quite independently of any organic nervous change, peripheral or central, and dependent upon some toxic substance present in the circulation. Experimental proof of this view is quite in its infancy; but still the results are encouraging. Bouveret and Devic[48] investigated the toxic properties of the stomach-contents of a case of gastric tetany, and were of opinion that in this condition a toxic substance is formed in the stomach in the presence of hydrochloric acid, and becomes absorbed into the system; and they concluded that this body was syntonin, to which special characters were added by the influence of alcohol. Injected into animals this body produced general convulsions. Halliburton and McKendrick[49] reported upon another case of gastric tetany; they found that the stomach-contents injected into animals caused a fall of arterial blood-pressure and slowing of the heart-beat; convulsions were not produced, but the material used was obtained from the stomach when the severe manifestations of auto-intoxication had passed off. Halliburton found this body to be acid and capable of producing its effect without the help of hydrochloric acid. The conclusion drawn was, that it is probable that the effects were produced by a direct reflex irritation of the cardio-inhibitory centre; and therefore it is not improbable that it could under other circumstances (*e.g.*, in greater strength of solution) have affected the centres

of the brain and cord. Recently, Carnegie Dickson[39] has reported a case of gastric tetany with recovery. It was found, as in several other reported cases, that the unmanipulated gastric contents were incapable of producing convulsions in animals. However, Bouveret and Devic's positive evidence is of greater value than this negative finding, especially when it is remembered that Halliburton used a feebly-toxic solution of the poison, and that in Carnegie Dickson's case, though use was made of solution of the stomach-contents removed from the patient whilst suffering from an attack of tetany, the material was not removed at the onset of the attack, nor, as in Bouveret and Devic's case, was intravenous injection practised.

Thus, the experimental evidence in favour of a toxic origin of these disorders is admittedly slender; but, considered with clinical evidence, it becomes much more weighty. The subject of uræmia and its causation is a difficult one; no satisfactory cause in the shape of a toxic body has been discovered. Many cases of tetany have been recorded in which albuminuria was present without changes being found in the kidneys, or in which definite Bright's disease was found; possibly in the former cases the albuminuria was the result of the severe convulsion, just as this may be the explanation of the very marked albuminuria occurring after epilepsy; but there may be a common cause for the convulsion and the albuminuria. In Case 7, related above, the first symptom complained of was acroparæsthesia; no convulsions had as yet occurred, and the urine was loaded with albumen. This patient died within a few days of uræmic coma and Bright's disease was found. Hoffmann's[45] case of tetany also suffered from acute nephritis; two of Trevelyan's[51] cases and Blazicek's[28] showed chronic Bright's disease. Loeb[8] describes a case of tetany in which albuminuria occurred and yet the kidneys appeared to be healthy. Delpech and Rabaud[8] observed albuminuria as an accompaniment of tetany, but Berger[55] considered this albuminuria (also described by Imbert-Goubeyre) to be a mere complication (?). Sir William Gowers[36,5] found that, as a rule, albuminuria was absent in tetany, but he relates two cases in which it was present; he further acknowledges that tetany may occur in Bright's disease. Albuminuria has been met with in tetany by Dreyfus-Brissac,[36] Halliburton and McKendrick, and Carnegie Dickson.

The great similarity between the manifestations of gastric tetany and those of eclampsia and uræmia is further borne out by Neumann's[50] observation in 1861. Trevelyan[51] almost mistook his first case of gastric tetany for uræmia, and Fenwick's[59] case was admitted to hospital as "kidney-disease with uræmic convulsions," while in the case of gastric tetany reported above very considerable albuminuria was present. It will be argued that if renal disease and the manifestations known as gastric tetany had any very close relationship, tetany, in severe or mild form, would be more frequently met with in renal disease. In answer to this, it may be stated that it is common experience that mild tetany present in cases of gastric disorder is often only discovered by close cross-questioning of the patient. Moreover, no attempt is here being made to prove that there is anything other than a close similarity between the symptoms of gastric tetany and those of uræmia: they both appear to be toxic in origin.

It may be objected that the acroparæsthesia of Case 7 was really not complete tetany. Frankl-Hochwart would restrict the term to those cases in which, besides vomiting, acroparæsthesia and generalised spasm, there are present the more pathognomonic signs described by Trousseau, Chvosteck, Hoffmann, and Erb; but most writers acknowledge, with justice, that mere sensory disturbances of the extremities, which may be present alone or which occur between the graver attacks, are due to smaller doses of the poisonous agent (von Jaksch,[60] Kuckein[61]).

There are other suggestive and interesting associations. Thus, uræmia has been found associated with Raynaud's disease.[62] This is important, because in the absence of any record of vascular disease in the milder forms of Raynaud's disorder, it would suggest that in this disease a poison similar to that of uræmia can cause, not only tetany, but such a very different disorder as Raynaud's disease.

Tetany in its milder forms is commonly met with at the menopause (Elsner[22]); and in a case of this nature which is now under observation, and has already been referred to, not only are there vasomotor disturbances of the face and tetany, but there is the "syncopal" form of Raynaud's disease in the left hand and the "asphyxial" form in the right. Cases of tetany are

recorded associated with various psychoses (Luther [63], [64]). This writer compares the intoxication to that produced by lead; and analogy at once suggests a closer resemblance still, for not only does lead produce cramp of the bowels (colic), but the curious mental conditions known as saturnine encephalopathia and saturnine epilepsy are also frequent sequels of lead-poisoning. Westphal [30] reports a case of tetany which he had treated with thyro-iodin; epilepsy occurred shortly after, not necessarily as a result of the therapeutic measures, for he quotes a case described by Gassner in which, independently of thyro-iodin, epilepsy followed a day after the onset of tetany. Neumann's [30] original case of tetany also had epilepsy. Blazicek [63] records a case of hysteria associated with pseudo-tetany (?). Epilepsy occurred in Halliburton and McKendrick's case, lasting 36 hours; and Tresilian [65] found tetany associated with epilepsy and chorea.

It will be thus seen that tetany is curiously related to various other disorders, the pathogeny of which is entirely unknown to us, and in which morbid anatomy is unable to enlighten us, while too often treatment of such cases is expectant. In some cases, *e.g.*, in tetany, lavage and operative procedures are very successful and help us to form some views as to its causation. So far we are quite ignorant of the cause of tetany, uræmia, epilepsy, chorea, eclampsia and various other disorders. Probably in all cases some auto-intoxication has occurred, and the various poisonous bodies have one common character—they are convulsants; in epilepsy they probably act upon the cortex of the brain; in tetany and allied disorders they may act through the peripheral vessels.

We may summarise our deductions and say, that all sensory disturbances of the extremities are primarily due to local vascular disorder; in some cases these phenomena are dependent upon organic changes in the vessels (erythromelalgia, &c.); in others the changes are temporary, and due to the action of a poison capable of being removed or neutralised; in others again, both factors may be at work.

There still remain cases, in which so far as clinical investigation can be carried out, neither local vascular disease nor toxic influence can be discovered; to such cases the

term "idiopathic acroparæsthesia" may be applied; but from the considerations offered above, it is probable that more complete investigation will prove that even these cases can be explained by the discovery of one or other of these factors.

TREATMENT.

The greatest measure of success will follow upon a thorough examination of the patient. Briefly stated, it will be necessary to find out whether the patient, who is suffering from sensory disturbances of the extremities, has any central or peripheral nervous disease. Should no evidence be obtained of these conditions, then the diagnosis lies between local circulatory disorders of an organic nature and local vasomotor disturbances dependent upon a toxic body either introduced from without or of an autocthonous character.

*Acroparæsthesia of Vascular Origin.*—The problem here is one of considerable difficulty, and it is this class of cases which proves itself to be most obdurate and unsatisfactory. There are but few therapeutic means which have the least pretensions to being able to remove the thickening of the internal coat of an artery, or to produce the complete organisation and removal of a thrombus. However, we are encouraged by the results of prolonged treatment of phlebitis to think that much may be done in this direction. Prolonged rest, light diet, and moderate purgation will commend themselves at once; potassium iodide, mercury, and arsenic produce good results in some cases. In other cases where, in addition to the organic disease, a functional vasomotor neurosis is superadded, the nitro-compounds may prove of great use: especially is this the case in individuals suffering from the "syncopal" form of Raynaud's disease. Savill[9] finds that where dilatation of the peripheral vessels is present potassium bromide is of service. Besides internal remedies, much relief can be obtained in erythromelalgia by the continuous application of ice-bags. Radiant heat will give relief in other cases, but by far the most serviceable and popular remedy is the application daily for a quarter of an hour of the galvanic current, one pole being inserted into a warm salt bath with the affected limb or limbs, and the other applied to some indifferent part of the body. Opinions differ as to the superior efficacy of one

or other pole, either may be inserted into the bath, and the other fastened upon the body or on an unaffected part of the limb. Massage, and active and passive movements are also of the greatest service. Lately, high-frequency currents have been introduced; and though, as with other remedies, relief is but temporary, it is certain that such relief is very real. Unfortunately such treatment is beyond the reach of all but the wealthy classes. Most cases experience great relief by residence in warm, equable climates, though certain cases presenting symptoms like those of erythromelalgia are more benefited by a cold, bracing atmosphere. In the case of aged patients, especially when symptoms of acroparæsthesia supervene in the night, moderate exercise during the day, short of fatigue, is preferable to enforced rest; indeed such patients often prescribe thus for themselves, and are always better when moving about. In other elderly patients an enforced and regular rest in recumbency during the day is followed by relief.

Friedmann [5] explains the pains in the feet and hands in certain feeble people by the association of a weak heart with vascular disease, either of which disorders, in the absence of the additional impetus given by the contraction of voluntary muscles to the contents of the veins, leads to impaired peripheral circulation and functional disturbance of the nerves; hence the occurrence of these symptoms during the night and early morning.

Constipation should be met with mild saline purges. Saundby [12] thought that acroparæsthesia was dependent upon dyspepsia in all cases, but though this is so in a large majority of toxic acroparæsthesiæ, it is not the cause in this group of cases, though its existence would intensify the symptoms and it should be treated. Schultze's cases were probably dependent upon arteriosclerosis, and hence the disappointment he expresses in the application of various remedies directed against dyspepsia. Putnam found that phosphorus in $\frac{1}{24}$-gr. doses given three times a day gave great and even permanent relief. Sinkler,[66] who considered that acroparæsthesia was due to hyperæmia of the nerve-trunks and terminal filaments, gave ergot with good results. It must, however, be admitted that, only too often, cases of

acroparæsthesia of vascular origin and dependent upon arteriosclerosis fail to be relieved by any remedies; and eventually, when pain is considerable, the old-fashioned remedy of a quarter or half a grain of opium, given at night-time, is the only useful one.

It is impossible, in the absence of any pathological evidence, to affirm that the milder forms of Raynaud's disease are due to organic vascular disease, but their clinical relationship to symmetrical and senile gangrene and to erythromelalgia, in which vascular organic occlusion is the rule, justify the assumption that some permanent vascular changes are present sufficient, in the presence of external conditions, such as cold, &c., to produce the symptoms and signs. Treatment, when needed, is much the same as that for vascular acroparæsthesia.

In erythromelalgia, a disease in which vascular disease is commonly present to a very marked degree, the outlook is much less favourable. The pain met with is so very severe and often so very constant, especially in the upright posture and when the affected part becomes heated, that the patient soon becomes a confirmed invalid, and rest and the application of ice-bags are the only remedies. Amputation is justifiable in extreme cases, and if carried out beyond the seat of vascular disease, is followed by excellent results. Sclerodactyly is not accompanied as a rule by pain: remissions and recovery commonly occur. Cold, which so often produces an attack, should be avoided; general tonics may be of use, and systematic shampooing is advocated by Radcliffe Crocker.

2. *Toxic Acroparæsthesia.*—Very many and various causes may be at work, including poisoning by mussels and other shell-fish, or other forms of ptomaine-poisoning, and poisoning by ergot, arsenic, alcohol. Toxic acroparæsthesia is met with in pellagra, in lupinosis, in trichinosis, and helminthiasis. Brandenburg[67] records symptoms closely allied to those of tetany following the administration of chloroform and morphia, the inhalation of carbonic oxide, the use of lead, and after treatment with spermin. It also occurs in diabetes (Friedmann), in syphilis (? due to vascular disease), and in many cases of gastro-intestinal disorder, including cholera and other severe forms of diarrhœa. It is also met with in simple dyspepsia, in the vasomotor pseudo-angina of young women, or in the

tobacco angina of men: by many writers these latter cases are described as mild cases of tetany, just as carpopedal contractions may be considered mild cases of infantile tetany. Gastric tetany is mostly met with in cases of dilated stomach. Finally, Schmidt [4] refers to the tetany met with in Bright's disease and uræmia, in diseases of the thyroid gland, in Addison's disease, in acromegaly, and in disorders of the pancreas (*e.g.*, diabetes). Tetany is common at the climacteric period; it is met with in pregnancy, in lactation (Trousseau), at confinement, after operations upon the thyroid gland, in certain trades (*e.g.*, in shoemaking and tailoring), and especially in certain places, as in Vienna and Heidelberg, and more particularly from December to April. In many cases elevation of temperature occurs, and Frankl-Hochwart [68] thinks one form of tetany is infectious. The mere passage of a stomach-tube has been quoted as a cause of death in tetany,[69, 70] but this assumption has been disproved. If considered necessary, lavage is justifiable, for if death occurs it results from the toxæmia. Frankl-Hochwart records tetany occurring after typhoid fever, measles, croupous pneumonia, and rheumatic fever. Gowers refers to the occurrence of tetany in scarlet fever, and it is interesting to note in this connection that the lady clerk (Case 4), amongst other nutritional disorders, shows very marked transverse ridging of the nails, identical with that seen after scarlet fever and other infectious diseases. Tetany has been observed in association with lead-poisoning (Gowers), and with true angina pectoris. Tetany may be very prolonged. Levy-Dorn [71] relates the case of a woman who had tetany for three years, intensifying at each pregnancy: this case was finally cured by the use of thyro-iodin. Though not common, tetany has been observed in pyloric cancer.[72]

The above causes or associations are given at length in order to provide some clue to successful treatment. In many cases attention to the bowels and correction of dyspeptic disorders is sufficient to produce a cure. It is of the greatest importance that the association of mild forms of tetany and gastric dilatation should be recognised early and treated by the above methods and by lavage: even severe gastric tetany may be relieved by these measures; when they fail, no time should be lost before resorting to operation, for it is impossible in

such cases to know how long the system can tolerate the poisonous effects of the toxic body responsible for the tetany. For the relief of the acroparæsthesia in such cases Carnegie Dickson advocates the use of nitro-compounds.

Finally, toxic acroparæsthesia is most important as an early sign of the onset of an attack of uræmia, or of the presence of grave renal disease; and the ordinary routine treatment for such cases by free purgation, diaphoresis, and diuresis will serve to relieve the tetany, and possibly to ward off what might otherwise be a fatal issue, as in Case 8, related above. The "tender toes" complained of in typhoid fever are often relieved by an increase in the diet, and by the use of stimulants; in the less severe and temporary cases the synthetic drugs, such as phenazone, phenacetin, &c., are of great use. That such cases may eventually go on to gangrene is of importance, and this fact would require a more speedy convalescence, and the employment of friction, active and passive movements, and a more generous dietary.

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# TUBERCULOSIS AND THE MEDICAL PROFESSION.[1]

BY ALFRED HILLIER, B.A., M.D.,

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TUBERCULOSIS is preventable, avoidable, and, if treated early enough, curable. Yet it still costs England and Wales 60,000 deaths a year, and throughout Europe its annual death-roll is estimated at a million.

In New York and in Germany[2] attempts have been made to calculate the economic loss sustained by the mortality from tuberculosis. Thus the annual loss to the United States from tuberculosis as it affects man is calculated by Dr. Herman Biggs, of New York, to amount to 330 million dollars (£66,000,000). This estimate is arrived at in the following way. Dr. Biggs puts a value of 1,500 dollars (£300) upon each life at the average age at which deaths from tuberculosis occur. This gives a total value of the lives lost annually (150,000) of 225 million dollars (£45,000,000). To this must be added the loss resulting from incapacity for work during illness. For at least the last nine months of life these patients cannot work, and the loss of service at one dollar a day, together with food, nursing, medicines, attendance, &c., at one and a half dollars a day, results in a further loss of 105 million dollars (£21,000,000), making a total yearly loss to the country of 330 million dollars (£66,000,000). For the city of New York the loss is 23 million dollars (£4,600,000). According to Dr. Biggs, the annual public expenditure in the city of New York for the care of tuberculous patients does not at present exceed half a million dollars (£100,000), or less than 2 per cent. of the actual loss by death, &c. If the annual expenditure were increased to 5 or 6 per cent. of the actual loss it would result in a saving of several thousand lives annually, to say nothing of the enormous saving in suffering.

[1] A paper read before the Woolwich, Plumstead, and Charlton Medical Union, May 12, 1903.

[2] "The Cost of Tuberculosis." *Tuberculosis*, April, 1903.

According to Mr. Shirley Murphy, over 7,500 deaths from phthisis occurred during 1901 in the administrative county of London. On the same estimate as that of Dr. Biggs, this means an annual loss of £3,300,000. The hospital and infirmary expenditure for consumptive patients in London probably exceeds £100,000 a year, but even admitting that it amounts to twice that sum, it is a paltry amount to contribute, even from an economic point of view, towards saving a loss of thousands of human lives, incalculable suffering, and £3,300,000 sterling.

With reference to the medical profession in its attitude towards tuberculosis, it will be universally admitted that individual efforts on the part of medical practitioners to lighten the load of poor consumptives by treating the disease are arduous, frequently entirely unremunerated, and unceasing. Medical Officers of Health, where voluntary notification of phthisis has come into force, have been able by issuing simple instructions and by measures of disinfection, to exercise a certain amount of control over the disease, and thus in a measure to prevent its spreading. On medical practitioners, on the other hand, has fallen the heavy burden of endeavouring to deal with and treat the disease and its effects, when once the condition has arisen. The relief of the effects of disease has always been regarded by the public as a medical man's chief function; and until recent years it was even by medical men themselves regarded, in relation to tuberculosis, as almost their sole duty.

The revolution brought about by the discoveries of Pasteur has not yet been completed. Bacteriology, which raised medicine to the dignity of a science, still suffers to some extent from being regarded as a parvenu; and yet out of the application of the knowledge it has given us, is rapidly being evolved the art of the control of pestilence. It teaches the *rationale* and practice of prevention; it provides, and gives promise of still more richly providing, specific curative remedies.

But it is prevention which really combats and lessens the prevalence of tuberculosis far more than treatment. Prevention has done a hundredfold more for the suppression of disease than was ever accomplished by therapeutics. What is antiseptic surgery but prevention—protection from the onset of

septic disease? What is vaccination? When Pasteur,[1] the layman, the presumptuous chemist, who dared to obtrude himself into the sacred precincts of medicine for the purpose of acquainting its professors with a few scientific facts, was rebuked in disdainful tones by one of the medical luminaries of his day, he made a memorable reply. M. Peter, a leading Paris physician, in a discussion on some of Pasteur's work, said: "What do I, a physician, want with the minds of the chemist, the physicist, and the physiologist?" To which scientific blasphemy Pasteur replied: "On hearing him speak with so much disdain of the chemists and physiologists who touch upon questions of disease, you might verily think that he is speaking in the name of a science whose principles are founded upon a rock! Does he want proofs of the slow progress of therapeutics? It is now six months since, in this assembly of the greatest medical men, the question was discussed whether it is better to treat typhoid fever with cold lotions, or with quinine, with alcohol, or salicylic acid, or even not to treat it at all."

And are we not somewhat in this position with reference to tuberculosis? The therapeutics of tuberculosis—until bacteriology produces some effectual tuberculin, anti-tuberculin, or other serum—are but a poor thing after all. The dispensary medicines may occasionally relieve symptoms; the open-air treatment undoubtedly does cure or produce arrest in a large number of early cases, and a small proportion even of advanced ones; but neither medicinal, nor hygienic, nor climatic forms of treatment can be regarded as specific and final.

How, then, has bacteriology aided man in the handling of tuberculosis? It has at least demonstrated beyond any reasonable doubt the true nature of the infectivity of the disease, and on that knowledge it is possible to devise the most effectual measures for preventing its spread. In other words, it teaches prevention.

The precise nature of the infectivity of phthisis has been made the subject of a long series of experiments by Professor Flügge[2] and his assistants, Laschtschenko, Heymann, and others, and an account of these experiments is contained in a paper

[1] *The Life of Pasteur.* By Vollery-Radot.

[2] *Zeitschrift für Hygiene und Infektionskrankheiten*, Band XXX. und XXXVIII.

which I contributed to the *British Medical Journal*, March 14th. I will not, therefore, say more with reference to these experiments here than that they contain conclusive evidence to show that the infection of phthisis is conveyed not only by dried and pulverised tuberculous sputa, but by the cough-sprayed minute droplets of the consumptive when coughing, speaking, sneezing, or making any other forcible respiratory movement.

When I was in Berlin last December two points in reference to the whole subject of tuberculosis struck me with special force :—

(1) The great emphasis laid upon the cough-sprayed infection in phthisis ; and

(2) The drop in the Prussian tuberculosis death-rate.

And on these two points I was fortunate enough to have several conversations with Professor Koch.

The chart which I prepared to illustrate a paper read before the Incorporated Society of Medical Officers of Health (and which accompanies this paper) shows the annual tuberculosis death-rate per 10,000 in Prussia and in England and Wales respectively since the year 1875, and a comparison between the two brings out various points of considerable interest. Thus it will be seen that, while the English decline in the tuberculosis death-rate is a fairly constant one, the decline in the Prussian tuberculosis death-rate is by no means of the same character.

In England the deaths from phthisis have been declining since 1838, when they stood at 38 per 10,000, down to the present time, when they are only 13 per 10,000 : and this decline, in the opinion of many competent authorities, is associated with, and largely attributable to, the generally-improved sanitary conditions and food-standards among the working classes. Professor Koch is also of opinion that the degree of segregation and isolation afforded by our "chest-" and general hospitals has materially aided in this fall.

In Prussia, whose statistics do not deal with the phthisis-rate alone, but with the whole of the deaths from tuberculosis, the only decline—and that is a rapid one—of which the statistics furnish a record has occurred since 1886. From 1876 to 1886, a period during which our tuberculosis-rate was steadily diminishing, the Prussian rate remained stationary at

about 31 per 10,000. But in 1887 the drop in the Prussian rate began, and it has continued comparatively steadily down to 1900, when it had fallen to 21 per 10,000. In England in the same period the drop in the tuberculosis death-rate has only been from 24 to 19 per 10,000 (*vide* chart).

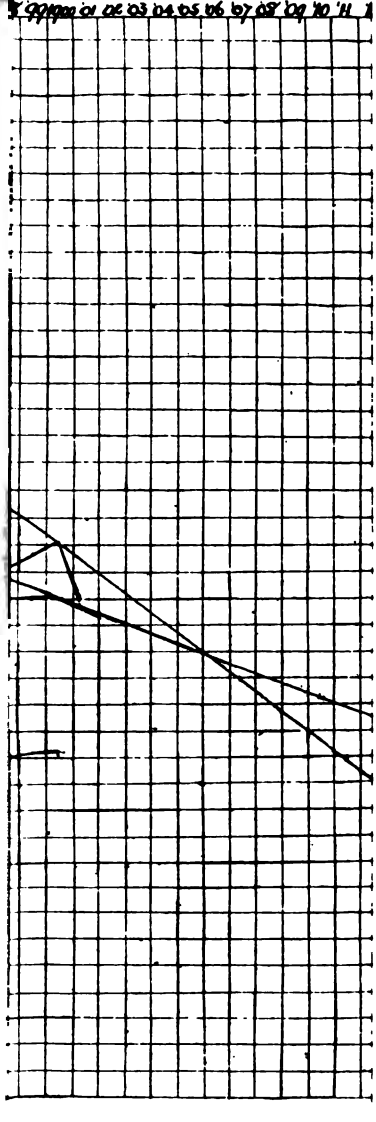
To what, then, is the phenomenal drop in the Prussian tuberculosis death-rate due? I felt the purport of my interviews with Professor Koch to be of such an interesting character that I wrote a series of notes on them which I submitted to him. He read them carefully, making a few alterations, and then handed them to me, signed by himself as accurately expressing his views. From these notes I extract the following as directly bearing on the subject of this paper:—

"Professor Koch is greatly impressed with the statistics recently published in reference to the fall of the tuberculosis death-rate in Prussia. While he believes that sanatoria have played some part in the falling death-rate, he does not consider that they have been as yet numerous enough to form the chief factor in that decline.

"The chief factor, in his opinion, has been the knowledge of the infectious character of phthisis and the precautions gradually brought into practice, even among the lowest classes in Germany, against it. He thinks, however, that from a preventive point of view neither England nor Germany have as yet provided to a sufficient extent the most essential of all institutions—the institution for advanced cases.

"Early cases of tuberculosis where any tubercle-bacilli occur in the sputum are a danger, but the danger from them is trifling compared to the danger arising from the advanced and fatal cases.

"It is," said Koch, "the victim of consumption, who, after, say, some months in a general hospital, finding himself rather worse than better, goes home to die, who is the most terrible source of further infection. You speak of education in the sanatoria, and for the early cases which recover this is of the utmost practical value; but for the dying man in his cottage how can it serve? The last three or four weeks of life are the most deadly in the spread of infection. The man dies at last, but the education in him dies before him; his every cough,



sneeze, or effort at speech sends forth a spray laden with bacilli in virulent form, deadly to the poor wife and children around him. It is not cruelty to isolate these cases; it is the truest and highest kindness. Let their days be made as pleasant as ingenuity can make them. Let them in some airy ward or open *liegehalle* receive visits from their friends even in these last days; but let them go to the grave with the consolation of knowing that they are not handing on a legacy of tragedy to those they leave behind.

"In all other infectious diseases we attack infection at its source; cases of small-pox, of leprosy, of diphtheria, or of plague, are isolated, but cases of tuberculosis in their last stages, the most deadly stage of the most deadly disease of all, are still allowed throughout Europe to spread further infection broadcast in the midst of their already-destitute families. This fact does not yet seem to be learned. When it is, and when we have these homes for the hopeless cases adjoining every city, then tuberculosis will pass from the midst of us."

I asked Professor Koch, if the sputum of all consumptive cases were properly collected and sterilised, whether the danger of these extreme cases was still so great? He replied, "You cannot abolish danger of infection by merely controlling the sputum. I have given to this question most earnest study, and I am convinced that, dangerous as sputum is when left to dry and pulverise, and essential as it is to control sputum by collecting it in spittoons and destroying its virulence, it is the microbe-laden spray shed by the consumptive around him in his last stages that is the most deadly method of conveying the disease. Every cough, sneeze, or effort at speech or other similar breath-movement, sets this spray in operation."

Being profoundly impressed with the conclusions which patient years of research, since his first discovery, have led Professor Koch to come to in regard to the relative importance of dried sputa and microbe-laden spray as vehicles for the conveyance of infection, I asked him what considerations have led him to this conclusion. He replied that in numerous experiments with pulverised sputa by Cornet, and with microbe-laden spray by Flügge and his assistants, it has been shown that pulverised sputum, as well as sprayed sputum, is infectious; but the latter is much more to be feared, because

in the sprayed sputum the drops are so minute that they penetrate more easily into the deeper recesses of the lungs than the coarser particles of pulverised sputum.

In regard to the infectivity of phthisis it is frequently argued that the degree of that infectivity must be low. But if the infectivity of phthisis is low, so also is the possible period of conveying infection extended, and thus the chance of conveyance from any individual case exists frequently for years. The extension of the period counterbalances the low degree of infectivity, and renders the ultimate danger of handing on the disease approximately equal to that existing in the ordinary more highly infectious, but less prolonged, epidemic diseases.

It must be admitted, however, that there is pretty conclusive evidence to show that, as a rule, tuberculosis requires certain conditions of environment for the propagation of infection which are not necessary in the case of more highly infectious diseases. Thus the infection of phthisis is conveyed to a certain proportion of those exposed, when the exposure is in a close, confined atmosphere, such as that of a workshop, a cottage, or a city tenement. It is also occasionally conveyed in a general or chest-hospital, but almost never in a wind-swept sanatorium. From chest-hospitals a few cases of young residents being affected have come under my own notice, and Koch informed me that there was similar evidence of such infection in hospitals in Germany. But in sanatoria such as Turban's at Davos, and the Victoria Hospital, under the care of Dr. R. W. Philip, near Edinburgh, both of which have been in existence for several years, no case of infection has been observed.

With regard to the facts of the infection of phthisis there appears to-day to be fairly unanimous agreement. At any rate I am not acquainted with any attempt at a scientific refutation of those I have referred to, although on such a question as the relative importance of "dust" and "drop" infection, there is room for, and there exists, difference of opinion. But on the main facts scientific men are agreed.

In view of these facts we may fairly ask ourselves whether the medical profession in England as a whole is doing all that might be done to combat tuberculosis? The Prussians are making more progress considerably than we are in lowering the tuberculosis death-rate. Their resources in the matter of

sanatoria far exceed ours, and the dissemination of knowledge on the subject of simple measures of prevention among the working classes is wider in Germany than in England. At the same time we have great facilities in this country for furthering measures of prevention, and in some instances they have been made use of.

Thus there can be no question that in the last few years the Medical Officers of Health have in many instances, aided by voluntary notification, been doing their utmost to obtain some control over the disease. Personally, I believe that compulsory notification, such as now obtains in New York, would materially strengthen their hands, and I hope that it may shortly be introduced—as it could be with the consent of the Local Government Board—wherever the local authorities are prepared to support the Medical Officers of Health in asking for it.

But with reference to the profession generally, while many individuals have worked hard and enthusiastically in this matter, there has not yet been much systematic and organised effort. There are two directions in which much might immediately be accomplished, and in both cases I believe the profession would welcome an effort towards that accomplishment. For successful effort in these directions, coöperation among members of the profession is required; and it is perhaps for this reason, in view of the many calls which practitioners have upon them, that no systematic action has yet been taken.

Perhaps the most important and influential of all existing institutions for disseminating knowledge and introducing simple measures of prevention among the mass of the working classes are the out-patient departments of our large hospitals and out-patient dispensaries. The control of these departments is in the hands of one of the most distinguished and hard-working branches of the medical profession, whose unceasing labours frequently extend over many years; and these out-patient departments are the principal channel through which a very large proportion of the working classes derive medical advice and aid. Among the patients who attend the proportion of tuberculous cases is very high, and whatever benefit they may hope to derive from treatment of their disease, there can be no doubt that the time has come when the opportunity offered by

their attendance should be taken to impress upon them the necessary precautionary measures, both for the sake of themselves and their neighbours. This can best be done, as is done in the anti-tuberculosis dispensaries of Calmette at Lille, and in certain towns in Belgium, by issuing to every patient a leaflet of simple instructions, and supplying a pocket spittoon. At Brompton and some other hospitals, leaflets are distributed, but it is useless to tell a consumptive not to spit all over the place unless he is supplied with something he can spit into. An excellent pocket spittoon can now be supplied wholesale at a cost of 6d.

One of the objections urged against supplying the pocket spittoon is that the out-patient will not use it, but will dispose of the spittoon. This would perhaps be true of a certain number of cases, but it would not be true of all, nor, I believe, even of a majority. And if the possible abuse of any reform by a certain number of persons is to prevent any reform at all, then England will not merely remain five years behind Germany in dealing with tuberculosis, but will eventually be even more behind, as she already is, in the application of various sciences to the arts of everyday life.

The second great resource in the hands of the profession generally is that of cordially supporting voluntary notification to the Medical Officers of Health, wherever the local authorities will encourage and pay for it; and further bringing pressure to bear on the Medical Officers of Health and the local authorities wherever voluntary notification is not yet established.

The leaders of the friendly societies and the Hospital Saturday Fund are already anxious to institute notification and supply information in reference to tuberculosis among their members, but it is difficult for them to make much progress until the medical profession generally has entered, a little more systematically and a little more cordially, into measures for the prevention of tuberculosis.

# ATELEIOSIS: A FORM OF DWARFISM.

By HASTINGS GILFORD, F.R.C.S.

[With Plates LXXV.–LXXXI.]

## INTRODUCTION.

THE word ateleiosis (ἀτελείωσις, not arriving at perfection) has been applied[1] to a peculiar disorder of development. Of this disorder there appear to be two varieties. In the one there is conspicuous delay of both growth and development up to the onset of puberty. The sexual system then matures, and the development of the body becomes arrested, leaving the individual sexually complete, but in other respects with the proportions and outward appearance of stereotyped childhood. Hence in this variety there is infantilism up to puberty and after that period there is dwarfism only. But in the second variety there is as a rule both dwarfism and infantilism throughout the whole of life, for the sexual system never matures, while growth may continue up to the age of 30 or even later.

It is this latter, or asexual, form with which we are concerned now. This kind of ateleiosis resembles cretinism in that it varies in character according to the age at which it begins. Hence it may be divided into three groups:—(i) We have first ateleiosis beginning in fœtal life. In the single case (*see* p. 798) which has hitherto been recorded there were indications of microcephalic imbecility. This was not due to any relative disproportion in the size of the brain, but was apparently the result of the delay of development having taken place at a period when the brain was too small or imperfect to perform its functions properly. (ii) In the second group ateleiosis begins during infancy or early childhood. It is then stamped with the facial and other features which distinguish this time of life. (iii) In the third group ateleiosis begins at some later period of development and the characters of the disease are more indefinite. They consist in a perpetuation of the height and other distinguishing features of the period of youth.

[1] See *Medico-Chirurgical Transactions*, Vol. LXXXV., 1903, p. 305.

It is now proposed to give a description of five examples of the disease. Of these one belongs to the first or fœtal group; three are of the infantile or second group, one of these being a skeleton only; and the fourth is of the third group. In this last case a post-mortem examination was made. A short account will also be given of those instances which have been described by other writers.

GROUP I.—ATELEIOSIS BEGINNING DURING FŒTAL LIFE.

*Case* 1.—In the Museum of the Royal College of Surgeons of England is the "skeleton of a female child of unusually stunted growth and arrested osseous development." It is the skeleton of Caroline Crachami, who was exhibited in London in 1824, under the name of "the Sicilian dwarf," and at the

*Fig.* 1.

Caroline Crachami. From a painting in the Museum of the Royal College of Surgeons of England. The ateleiosis began in fœtal life. The portraits show the prominent nose and receding chin, which are characteristic of microcephalism.

time of her death was said to be of the age of 9 years. A portrait of her in oils is also preserved on the walls of one of the staircases in the Museum. Through the kindness of the Council of the Royal College of Surgeons I have been able to obtain a photograph of both the skeleton and the picture. A cast of her face, left ankle and foot, and a portion of one

## Plate LXXV.

A B

*Fig. 2.*

*Ateleiosis. Group I. Case* 1. Skeleton of Caroline Crachami (A) standing by the side of normal skeleton of a child of 15 months (B). The ossification of the former is less advanced than it is in the latter. The skeleton, which is in the Royal College of Surgeons' Museum in London, is distorted by the passage of an iron rod through its cerebro-spinal axis.

upper extremity, are included in the case with the skeleton. Her attitude is indicative of weakness or fatigue, and the expression of her face is dull and heavy. She looks older than her years, but this is partly due to the prominence of her nose, which would have been remarkable even in an adult. Her hair is plentiful, and the nails are well formed.

After her death an examination of her body was made by Sir Everard Home,[1] who has written the following account of her :—

"An Italian woman, aged 20 years, when, by her reckoning, three months gone with her child, was travelling in a caravan with the baggage of the Duke of Wellington's army. In the middle of the night, in a violent storm, when she was fast asleep, a monkey that had been chained on the top of the caravan, in its fright found its way into it, and, as the warmest berth it could find, got under her clothes. Half asleep, she put her hand down to scratch herself, but on scratching the monkey it bit her fingers and threw her into fits. She did not miscarry, but went her full time. The child, when born, weighed 1 lb., and measured 7 inches in length. It was reared with difficulty, and was carried by its parents to Ireland, where it became consumptive.

"It was brought to London and shown as a curiosity. It died just after it completed its ninth year. I saw it several times while alive, and it came into my possession after death.

"On examination of the body after death the fontanelle was closed.[2] There was no fat in any part but in the sockets of the eyes, behind the balls. The uterus had not been developed beyond that contained in a fœtus of four months. The bladder was distended with urine to the size of a hen's egg. As the child had never made water freely from its birth, the bladder probably had been injured at the time the monkey alarmed the mother. On comparing the ovaria with those of an abortion of three months, they were nearly of the same size.

"The child, when I saw it, could walk alone, but with no confidence. Its sight was very quick, much attracted by bright objects, delighted with everything that glitters, mightily

[1] *Lectures on Comparative Anatomy*, 1828, Vol. V., p. 191.

[2] This is incorrect.

pleased with fine clothes; had a shrill voice and spoke in a low tone; had some taste for music. Was very sensible of kindness, and quickly recognised any person who had treated it kindly. The mother has had a fifth child in Ireland, which, like her first three children, is naturally formed."

In the accounts of her death in the newspapers[1] of the day, it is stated that she had been "for some time afflicted with a cough," and that "on Thursday last she was exhibited as usual, and received upwards of 200 visitors; towards the evening a languor appeared to come over her, and on her way from the exhibition room she expired."

The skeleton has been but indifferently mounted, for a rod has been so run through the cerebro-spinal cavity as to obliterate all the natural curves, dislocate the atlas and skull off the axis, and project through the anterior fontanelle.

From this cause it is impossible to obtain accurate measurements of some parts, and the whole aspect of the skeleton is distorted. The clavicles are horizontal, the scapulæ are dragged away from the thorax, and the shoulders are raised so as to appear stiff and square, very different from their rounded appearance in the painting. Owing to this elevation of the shoulders one does not notice at first that the upper extremities are too long, since they do not reach below their usual level. The pelvis, also, is made to project forward so that its brim is almost horizontal, while the lower limbs are dragged up to such an extent as to diminish the height appreciably.

Another source of inaccuracy of measurement is due to shrivelling of the epiphysial cartilages.

Height, 49 cm. (19 inches).

Middle point of total height, 1·3 cm. above the symphysis pubis.

Length of spine, 5·8 cm.

Clavicle, 4·8 cm.

Acromion to elbow, 8·9 cm.

External condyle to lower end of radius, 7 cm.

Femur, 12 cm.

Tibia, 9 cm.

Total length of lower extremity, 23 cm.

[1] *The Newspaper*, June, 1824.

Foot, 6·8 cm.

Hand, 6 cm.

Skull: greatest length, 12·6 cm.; greatest breadth, 9·4 cm.; vertex to base, 8·55 cm.; circumference, 35 cm.

The skull is very thin and delicately formed. The anterior fontanelle is open for a length of 1·6 cm. and a width of 1·2 cm., but the posterior fontanelle is closed. The lower half of the frontal suture is closed, but there is a small unossified oval area 6 mm. long, near the superior angle of the occipital bone close to the left lambdoid suture. Another is present at the bottom of each occipital groove. The basi-sphenoid and basi-occipital bones are not united. There is no thickening of the sutures. The skull is unopened, but on placing a lighted match in the occipital foramen the bones of the calvarium are seen to be of fairly even thickness, and on looking through the open fontanelle the sella turcica and the other parts of the base are also found to be normal. The ear-bones are of adult size, but the auditory process is a mere ring, like that which is met with in infants. The palate is of normal shape, but the alveolar border of the upper jaw is very irregular, and, owing to absorption of the outer part of the alveolus from the canine teeth backwards, descends lower in front than behind. The mandible is ill formed: its angle and ramus are like those of an infant, and while the alveolar portion is unduly thick, the chin is ill developed, and therefore recedent. The dental formula is as follows, viz.:—

Upper jaw, 2 m. × 1 c., 1—2 in., 1 c. × 2 m.

Lower jaw, 2 m. × 1 c., 1 – 2 in., 1 c. × 2 m.

The teeth are all of the temporary set, and are of natural size as a rule, but very irregularly placed. All four of the second molars can be seen, though they do not project to the level of the gums. The two upper first molars, as well as the right upper second molar, are carious, but the others are sound.

Ossification throughout is greatly delayed. This is shown both in the backward condition of the epiphyses, and in the smallness and delicacy of the shafts. There is only a trace of roughness to show where muscles were attached, and the position of several of the muscular prominences is not visible. The long bones possess hardly any curve, and are narrowest at the middle of their shafts, increasing in width towards

their ends. The ribs have very abrupt curves at their angles, but are almost straight from that point forwards, while those on the right project farther and are more horizontal than those on the left. This last peculiarity of position is possibly due to the way in which the specimen is mounted. Ossification is very backward. Thus there is noepiphysis for the radius or ulna of either side. Of the carpal bones, those for the os magnum and cuneïform are alone present. There are no centres for the heads of the metacarpals. Ossification is almost equal on the two sides, and is about equal to that of a child during its second year. The centres for the lower ends of the radii, of the fibulæ and of the gladiolus, which ordinarily appear in the second year, are not present, whereas those of the lower end of the tibiæ which appear in the second year are well represented. There are also traces of the heads of metatarsal bones which do not usually appear until the third year. Ossification is therefore somewhat irregular, but, on the whole, is not more advanced than that of most children between one and two years of age. The dentition is that of a child who has attained the age of two years. But on comparing the proportions of Caroline Crachami with those of a normal child we find that the height of her skeleton (49 cm.) is a little less than the measurement which Spiegelberg[1] gives of the height (51 cm.) of an average mature fœtus; while the length of the skull of Caroline Crachami is 12·6 cm., as compared with 11·75 cm. of the normal newborn infant. The breadth of the skull in Caroline Crachami is 9·4 cm., as compared with 9·2 cm. of the newborn child. In other words, if we add on a little to the measurements of Caroline Crachami in consideration for the loss in height which is produced by the method of mounting, and for the measurements having been taken from a skeleton, we may say that while she was of the height of a newborn baby of average size, her skull was a little large especially in the longitudinal diameter.

*Remarks.*—Caroline Crachami is an example of one of two possible diseases. We must either regard her as what the French term a sub- or demi-microcephalic imbecile, or as an instance of ateleiosis occurring in fœtal life. There seems to be no question that she was an imbecile. Her inability to walk

[1] *Text book of Midwifery* (N.S.S. translation), Vol. II., p. 121.

with confidence, her quickness of sight, attraction to bright objects, and pleasure in music and fine clothes are all points which would claim attention in an imbecile. The fact that they are recorded implies that they were the most conspicuous features of her mental condition, and that indications of a higher intelligence were absent. This view is corroborated by the facial appearance of the child, which is eminently characteristic of microcephalism. The nose is much too large in proportion to the face, and the mandible is too small, giving a ferrety or rat-like appearance to the countenance, such as is commonly seen among small-headed idiots.

On the other hand, the head is distinctly not microcephalic. Its size is, on the contrary, rather over than under that which is natural to infants whose development corresponds with that of Caroline Crachami. Moreover, observations which have been made on the bones of microcephalic idiots show that there is no delay of development in their case.[1]

In favour of the case being one of ateleiosis is the marked delay of development of the skeleton and the comparatively large skull: also we have the very important fact that the internal sexual organs were still more backward in their development than were the bones. There is, therefore, good reason to believe that Caroline Crachami's condition was not due to primary hypoplasia of the brain, but was the result of a more widespread developmental error. In other words, the hypoplasia of the brain was only part of a general hypoplasia. At the same time we must recognise that it was probably this defective development of the brain which gave the case its peculiar features. Though the virtual arrest of development of the brain of an infant may not interfere with the intellectual faculties beyond keeping them more or less childish, yet, if the arrest takes place at an earlier age, there must be a period at which development cannot be virtually stopped without imbecility resulting. In that case, what is more likely than that the condition will present the facial as well as the mental characters of primary microcephaly? It should be noted that according to Boyd's tables[2] the weight of the brain at the age of nine years (1154 grammes) is not far from its highest

[1] Dr. Placzch: *Zeitschrift f. Ethnol.*, 1901, p. 335.
[2] Quain's *Anatomy*, Vol. III., Part I., p 178.

(1244 grammes), whereas in the case of Caroline Crachami, we must regard the brain as but slightly heavier than that of a newborn child (283 grammes).

### GROUP II.—ATELEIOSIS BEGINNING DURING INFANCY OR EARLY CHILDHOOD.

*Case 2.*—According to his birth-certificate, T. L. Spooner was born in Layer Breton, Essex, on February 23, 1874, and is therefore now 28 years of age. The photographs of his father and mother and some of his brothers and sisters show that they are all of ordinary size and development. Of five brothers and two sisters one only is dead (from pneumonia). He was of average size when born, and cut his teeth at the usual age. He had measles in childhood, and during the last three years has had influenza twice. Nothing is known of the closure of the fontanelles. It was first noticed that he was not growing when he was between one and two years old, though there was no illness nor any other circumstance to account for it. He went to school at ten, and left at sixteen, after passing the sixth standard. I first saw him when he was just over 23 years of age. He was then 1·078 m. (3 feet 6 inches) in height. One year afterwards, when I measured him again, he was 1·086 m. high, and three years later he had still further increased to 1·096 m. On February 21st of this year, or one year after he was last measured, he was still of the same height. Other measurements taken on this last occasion were as follows, viz.:—

Head, 49·5 cm. in circumference; 17 cm. in greatest length; 13·9 cm. in greatest breadth.

Round chest in nipple line, 62·6 cm. during inspiration; 61 cm. during expiration.

Round abdomen, 56 cm.; middle point of total length, 1 cm. above the pubes.

*Upper Extremity.*—Arm from acromion to elbow, 20·75 cm.; forearm, external condyle to styloid process, 17·3 cm.; length of hand, 11·75 cm.

*Lower Extremity.*—Great trochanter to external condyle 28·5 cm.; lower end of femur to internal malleolus, 24 cm.; length of foot, 17 cm.

Weight, 25 kilos,

## PLATE LXXVI.

*Fig.* 3.

*Ateleiosis. Group II. Case* 2. T. L. S., aged 28 years, height 3 ft. 7 in. (1·096 m.), standing between a normal adult man and a normal boy of 6 years. The physiognomy and proportions are childish and the sexual organs infantile, while the attitude, expression and the markings of the face are suggestive of age. *See* page 804.

## Plate LXXVII.

*Fig.* 4.

*Ateleiosis. Group II. Case* 2. Radiogram of hand of Plate LXXVI., age 28. The ossification resembles that which is usual at from 10 to 12 years. Note the size of the hand. *See* page 804.

These measurements vary very little from those which I made four years before.

*Dentition.*—A note made on this subject five years ago was as follows, viz.: "In both the upper and lower jaws there are four incisors, two canines, four premolars, and four molars, all being of the permanent set and, as a rule, in good condition. Of the canines, the permanent are only just appearing, while the temporary have not yet been shed. All the teeth appear to be smaller than usual, with the exception of these permanent canines." At my last examination the dentition seemed to be the same as when I made this note, except that the permanent canines were more advanced in their eruption, and that the two temporary canines of the right side had been shed. The teeth showed no evidences of syphilis.

*General Appearance.*—T. L. S. is in many respects like a child. This is evident, in the first place, from his size, which is no greater than that of an average child of between six and seven years of age. His general configuration is also that of a child, for the head is large in proportion to the body, and the outlines of the muscles of the body and of the limbs are hidden by fat, while the fingers and toes, with their nails, are rounded and childish in appearance. Chilblains are present on the fingers of both hands: he says that he has been subject to them in the winter for as long as he can remember. The head is of great depth from the ears to the sagittal suture, and is broad, as in young children. The face is also broad and the cheeks full, while the bridge of the nose is sunken. But what contributes more than anything else to his childish appearance is the absence of sexual hair. There is none on the body, and one cannot detect so much as a vestige of beard or moustache. On the other hand, there is abundant growth of light-brown hair on the head. The hair also encroaches upon the forehead in a way which is sometimes seen in young children. When he speaks his voice is more treble than that of an adult, though it is not quite childish in tone and pitch. The laryngeal cartilages are small, as in a child.

But, while he has all these outward manifestations of immaturity, there are marks of age upon his face, and a certain

air of assurance in his manner, which prevent his being mistaken for a child. His mental development and tastes are somewhat childish, for though he does not care to associate with children, he is inclined to indulge in childish games. He is fond of reading, and is capable of steady application to his daily work. He earns 3s. a week as an under-gardener. His muscles seem to be of the size and strength of those of a child of his height. The pulse averages about 100 beats to the minute. The heart is of normal size, but a faint, soft murmur can be heard after the second aortic sound with an interval between them. The arteries are in good condition, and there is no arcus senilis. The organs of special sense appear to be normal. He sweats freely when he exerts himself to any unusual extent.

*Genital and Urinary Organs.*—The breasts look prominent, but no gland-tissue can be felt. The external organs of generation are in size and appearance like those of a child of about three years of age. The testicles are undescended, though each forms a projection and can be felt in its canal. They are of infantile development, but testicular sensation is well marked. From what I can gather there have been none of the emotional evidences of puberty. The breasts are not developed. The urine is normal in quality, but I cannot speak as to its quantity.

*Osseous System.*—The fontanelles are closed. There appears to be no irregularity of ossification anywhere. All the bones are slightly formed. A skiagram of one hand taken four years ago shows that ossification then corresponded with that of a boy of about the age of 10 years, though the bones themselves are smaller than usual, and the muscular prominences are not easily detected. A skiagram which I had taken a year ago shows that ossification had made but little advance during the previous three years. The bones are, as a rule, perhaps, a little thicker or a little longer, but there appears to be no more progress in the fusion of the epiphyses. The hand is apparently just 8 mm. longer. The long bones of the arm and hand are perhaps more lightly and delicately formed than are those of most children of ten years.

*Case* 3.—The following is a female case in which I was able

## Plate LXXVIII.

*Fig.* 5.

*Ateleiosis. Group II. Case* 3. Age 18 years, height 2 ft. 9½ in. (·850 m.). A normal adult hand is introduced for the sake of comparison. Note the characteristic physiognomy, and the crowded teeth. A skiagram showed that ossification was equal to that which is usual at 6 years. *See* page 807.

to make a complete examination of the whole body, and to obtain a skiagram of the forearm and hand. This dwarf was born in Paris eighteen years ago. Her mother, who is of ordinary stature, sought my advice for obesity. She told me that there were two other children beside this dwarf, but that they and the father are of ordinary stature, and she does not know that any other member of the family has ever had any abnormality of growth. This dwarf-child was small at first, but grew at an ordinary rate until she was a little over two years of age. After this period she still continued to grow at a fairly uniform, but much diminished, rate. She has had attacks of bronchitis in childhood, but with that exception has been healthy. She presents no sign of approaching puberty, but, on the contrary, in almost every respect resembles a child. She differs in that her intelligence is certainly more mature than is usual in a child of her height. She is of a lively disposition, but is not restless. She sweats on taking any unusual exertion. Her hair is fine, eyes full, nose depressed at the bridge, lips thin. The appearance of her face is spoiled when she smiles by the projection of her teeth, which are also very irregular. Teething began, it is said, at the eighth month, but nothing is known of the time of onset of the second dentition. The teeth form two irregular rows and are much crowded and displaced. Some belong to the permanent, and some to the temporary set. In the upper jaw are four permanent incisors, of which the two lateral are only just through the gums, while two of the temporary set still remain. There are also two temporary canines, two premolars, and four decayed permanent molars, while one decayed temporary molar has been crowded out. In the lower jaw are only two small and imperfect incisors, two temporary canines, four crowded premolars, and two molars, one of which is decayed to the roots. The appetite is said to be excellent; she has six meals a day, and altogether her food is thought to be equal in quantity to that taken by an average child of the age of from 12 to 14 years. The mother states that the anterior fontanelle did not close until she was 7 or 8 years of age. Measurements of her head and body are as follows:—

Total height, 850 mm. ($32\frac{1}{2}$ inches).

Head: circumference, 445 mm.

Round the chest in the nipple-line between inspiration and expiration, 475 mm.

Round abdomen at umbilicus, 460 mm.

Arm, 153 mm.

Forearm, 140 mm.

Hand to extremity of middle finger, 107·5 mm.

Thigh, 230 mm.

Leg, 250 mm.

Foot, 125 mm.

A skiagram of the hands shows that the ossification is a little more advanced than that of a child of 6 years, as shown in Mr. Poland's atlas. Ossification is more forward in the right hand than in the left. Her manner is childish, and she has not the slightest objection to being stripped of her clothes and examined. She possesses no hair on her body, and her breasts and sexual organs are undeveloped. The pelvis is that of a child, and there has never been any sign of menstruation. A faint systolic murmur can be heard over the upper part of the sternum. The heart appears to be normal in other respects.

She possesses little muscular strength, but is able to endure more fatigue than most children of her height. Her mother declares that she can walk 2 miles, and has once walked 4 miles without undue fatigue. She gains her living on the stage and is an expert dancer.

*Case* 4.—There is a skeleton in the Barclay collection of the Royal College of Surgeons of Edinburgh which shows the changes which characterise the bones of these ateleiotic dwarfs and I have to thank the Museum Committee for permission to describe and photograph this specimen. I could find no description beyond that which is given on the label. This sets forth that it is "the skeleton of the dwarf Bobbie Fenwick who died in 1815, upwards of fifty. The bones of the os innominata remain disunited, as do all the epiphyses, except the right upper end of ulnar. Lines of junction can be seen in most vertebræ, ribs, sacrum, fingers, and toes. Several of the second set of teeth have never protruded."

The measurements of the skeleton are as follows:—

Height, 1·188 m. (3 feet 10 inches).

Length of spine, ·890 m.

## Plate LXXIX.

*Fig.* 6.

*Ateleiosis. Group II. Case* 4. Age 50. Height 3 ft. 10 ins. (1·188 m.). Skeleton of Bobbie Fenwick, from the Royal College of Surgeons' Museum, of Edinburgh. The bones are delicately formed, the epiphyses about the knee-joint are enlarged and many of the epiphyses are not united. The spine is too long owing to the insertion of excess of intervertebral cement.

Skull: greatest length, ·185 m.; greatest width ·145 m.; circumference, ·505 m.

Biacromial, ·285 m.

Humerus, ·350 m.

Radius, ·250 m.

Hand, ·130 m.

Femur, ·470 m.

Tibia, ·330 m.

Foot, ·153 m.

Pelvis, antero-posterior, ·065 m.; transverse, ·085 m.

Between anterior superior spines, ·160 m.

Crest to crest, ·173 m.

The bones are small and slightly formed, and the muscular prominences are not well marked, though they can be readily recognised. The proportions are, apparently, faulty, but allowance must be made for the very liberal supply of inter-vertebral substance[1] which has been put in by the articulator. In some parts, indeed, its depth equals or even exceeds that of the vertebræ between which it is placed. This accounts for much of the disproportionate shortness of the limbs, and also for the fact that the middle point of total length is at the sacral eminence, whereas it was probably during life a little above the pubes. Something should also, for the same reason, be discounted from the height, which probably did not amount to more than 1·100 m. during life.

The skull, it will be noticed, is a little below the average size for an adult. It is, apparently, of normal thickness, and shows no irregularities of ossification. The sella turcica is neither too small nor too large. The basi-sphenoid and basi-occipital are not yet united. The angle of the lower jaw is somewhat open, and the body is shallow, behind the canine teeth. The palate is flat, and the dentition is very irregular.

Its formula is—

$$\begin{matrix}\text{Upper } \frac{4}{3} \\ \text{Lower } \frac{}{3}\end{matrix} \text{ i. } \frac{2}{2} \text{ c. } \frac{4}{4} \text{ pr. } \frac{6}{4} \text{ m.}$$

In the upper jaws the right canine has evidently erupted at a much later date than its neighbours, and has been crowded

[1] According to Mr. Morris ("Anatomy of the Joints," p. 69) the inter-vertebral substance does not normally exceed one quarter of the total length of the spine, but in this skeleton it must be nearly half that length.

out by them. One of the premolars, though visible, has not descended. Of the three right molars, two have their crowns flush with the alveolus, as if they also had not erupted, and the same is the case with the last of the corresponding teeth on the left side. Another is decayed to the roots, and the third has been broken off. In the lower jaw the left lateral incisor has not yet been "cut," and the same is the case with the two canines. Two of the premolars are very little above the level of the alveolus. There is a cavity left by an absent first right molar, and the second has just erupted. All the teeth are of average size, but are very irregularly placed, some projecting unduly, while others are below their proper level. Another noticeable peculiarity in the lower jaw is the presence of two fissures, one running downwards just outside the right central incisor, and the other from the root of the right canine, so as, apparently, to separate the bone between them from the rest of the jaw. The spinal and sacral epiphyses are all united. The sternum is short, and the upper pieces are still separate, while the third and fourth show an evident groove in their line of fusion. The coracoid and acromial processes are still separate. The rib-epiphyses are all united. Ossification is, as a rule, more advanced on one side than on the other; thus the line of union of the right upper epiphysis of the humerus can be seen only on close examination, while, on the left side, it is evident at once. The stage of ossification is not symmetrical. This is especially true of the radii, for the head is still separate on the right side, while it has, apparently, been recently united on the left. The line of junction at the lower ends of each humerus can be seen only on near inspection. The lower ends of the radii are still separate, and so apparently are those of the ulnæ. The pelvis is flat and shallow, and the ossa innominata are still divided into their three constituent bones by well-marked cartilaginous divisions. The crest of the ilium is rough, and the edges are sharp, showing that its epiphysis had not united and has been detached. The cotyloid cavity is shallow and its lip irregular. The natural curve of the femur is not exaggerated. The head of the bone is flattened and roughened at its upper part, as if the cartilage there had been unusually thick. It is either ununited, or is quite recently united, to the

neck on the right side, but it is difficult to see the line of junction on the left. There is no adventitious deposit about this or any other joint. The neck is unusually short and runs into the shaft at an angle of about 120 degrees. The lesser trochanter is very prominent. A noteworthy point about the femur is the relative enlargement of each lower epiphysis, which is rather conspicuous. The lower epiphysis on the left side is detached, but on the right it is joined, and the epiphysial line can be seen with difficulty. In no case does there appear to be any cartilage in the epiphysial lines, and it is possible that the epiphyses are not always separate when they appear to be so.

*Cases described by other Writers.*—Of these, the first to appear was that brought forward by Professor Schaaffhausen in 1868.[1] This was a male, of the age of 61, who was 94 cm. in height, while the circumference of his head was 20 cm. There were three other instances of the disease among his brothers and sisters. He was of average intelligence, showed characteristic childish conformation of face and cranium, and was a double cryptorchid. He died from cerebral hæmorrhage. After death stenosis of the aorta and pulmonary arteries was found, together with atheroma of the semilunar valves and basilar arteries. Fourteen years afterwards[2] Schaaffhausen obtained the skeleton and found that nearly all the epiphyses were still ununited.

By far the most complete description of the disorder is that given by Dr. Arnold Paltauf[3] in 1891. His patient was a male of 49 years of age. He was 122·5 cm. high, and his head was of the circumference of 54 cm. He was of good intelligence. The genital organs were infantile. He died from tubercular disease of the lungs. The thyroid gland was found to be small and pale, but its weight is not given. The sella turcica was abnormally large, it being 6 mm. longer and 3 mm. broader than is usual in adults. Ossification was no further advanced than that which is commonly met with in boys of 7 years of age. A microscopical examination of some of the epiphysial

[1] *Verhand. d. Naturhist. Verein d. preuss. Rhein. u. Westphal.*, 38 Jahr., Erstes Heft, Bonn, 1868, s. 26.

[2] *Ibid.*, Bd. XXXIX., s. 10.

[3] "Ueber den Zwergwuchs in Anatomische und Gerichtsärztlicher Beziehung," 1891.

cartilages showed grosser appearances resembling those which characterise normal ossification, combined with the finer calcification-changes which are associated with old age.

Dr. Manouvrier's[1] patient was a male, 23 years of age, 17 kilograms in weight and 99 cm. high, while the head measured 530 mm. in circumference. He was normal at birth. He fell downstairs at 3 years of age, but impairment of growth was not noticed until he was 4. Growth to the extent of 4 cm. took place between 17 and 21. Some of the milk-teeth were still persisting. The genital organs were infantile, and his facial appearance, proportions, and gait were childish. A portrait which is reproduced with the article shows that he possessed the flat, broad face and *retroussé* nose which is characteristic of ateleiosis.

Dr. Zoachimsthal[2] of Berlin gives an account of a troupe of dwarfs. Four of these appear to have been instances of the asexual form of ateleiosis. The disorder was first noticed in the 3rd, 7th, 8th and 10th years respectively; and though the ages varied from 30 to 36 years, there was evidence in each case that recent growth had taken place. The tallest of them was no higher than a normal child of 11 years.

GROUP III.—ATELEIOSIS BEGINNING BETWEEN THE AGES OF INFANCY OR EARLY CHILDHOOD AND PUBERTY.

*Case* 12.—Martin Lane, aged 28 years, was of the following measurements:—

Weight, 35·6 kilos.

Height, 1·46 m. (4 feet 9½ inches).

Head: circumference, 52 cm.; length, 17·4 cm.; breadth 14·2 cm.

Chest round nipple-line, 73 cm. to 75 cm.

Abdomen at umbilicus, 69 cm.

Upper extremity: acromion to elbow, 24·5 cm.; external condyle to styloid process of radius, 22 cm.; hand, 17·5 cm.

Middle point of total height, 2 cm. above pubes.

Lower extremity: great trochanter to external condyle, 39 cm.; external condyle to external malleolus, 36·3 cm. hand, 25·3 cm.

[1] *Bull. Soc. Anthrop.*, IVe. série, Tome VII., 1896, April 2, pp. 264-290.

[2] *Deutsch. Med. Woch.*, No. 17, 1899, s. 269.

PLATE LXXX.

*Fig.* 7.

*Ateleiosis. Group III. Case* 12. Martin Lane, aged 28 years, height 4 ft. $9\frac{1}{2}$ in. (1·46 m.), is standing on the right, next to him is his brother of 13 and on the left is a normal adult. The ateleiosis began at the age of 14. Note the absence of sexual hair, the childish sexual organs, and the youthful aspect and proportions, combined with the weathering of age. *See* page 812.

*History.*—The father is a "small-made man," and rather below the medium height. The mother and six brothers and sisters are of average growth. There is a brother of the age of 13 who is 1·34 m. high. The mother believes that Martin was of about the same height when he was of the same age. It was noticed that Martin seemed to have stopped growing at about that time. He was then just leaving school. His mother cannot account for the circumstance, for he was quite healthy at the time and has had no illness either before or since.

*General Appearance.*—The proportions and appearance are those of a lad of 14 years. He was at one time shown at a meeting of the Reading Pathological Society, when nearly all those who were present judged him to be of that age. His occupation was that of a farm boy. It was not possible for him to get work as a man, and his mother said that she always kept his certificate of birth in hand, because no one would believe that he was other than a boy until she had shown it. I myself first saw him among the crowd at a village "jumble sale," and at once recognised that he was an instance of ateleiosis. The skin of his face was more rough and weather-worn than one ever sees in a youth, though his manner and voice were in keeping with his size.

His intelligence was not good, though he answered questions intelligently and seemed to have a fair memory. He had passed the fourth standard at school, and could read and write as well as most boys of his walk of life. His mother told me that he was too stupid to do better work than minding sheep, and that he was not worth the 3*s.* 6*d.* a week which was paid him. He was not quite so strong as his brother of 13, and on having him stripped it was evident that the muscles were not of good size. He was, however, capable of working all day and then taking a walk of 4 miles without feeling tired. His hands and feet were rather large, and there was slight kyphosis and lordosis of the spine. He was also knock-kneed and flat-footed to the same degree, so that his gait was somewhat awkward and shambling.

Though the skin of the body felt harsh and dry he said that he sweated when he became over-heated. The hair of his head was fine and thin: there was plenty of lanugo over the

body and limbs. His teeth were sound and the dentition was regular. There was no sign of syphilis either in the teeth or in any other part. His appetite and digestion were good: he ate about as much as is customary for a youth of his age. The bowels were regular; the urine was of sp. gr. 1,018 and was otherwise normal. The special senses were of ordinary acuteness. A skiagram of the right hand and wrist showed that the ossification was equal to that of a youth of 14 or 15. The distal epiphyses of the radius and ulna which usually unite at from 18 to 20 years were still separated by a narrow line of cartilage.

Auscultation of the heart revealed a slight basal systolic murmur, but no other abnormality. The blood-corpuscles counted by means of a Thoma-Zeiss hæmocytometer showed 4,800,000 red discs to the c. mm., while the leucocytes were in the proportion of 1 to 450 red. These white cells appeared to be normal, but no stained specimen was examined.

The external genital organs were of the size and appearance of those of a child of 8 or 9 years. There was no pubic hair. The right testicle was descended, and the left could be felt about half-way down the inguinal canal. Testicular sensation was present, but there was no sign of virility. He was of an unusually timid disposition and would never come to see me without his 13-year-old brother. He was also very modest and greatly objected to exposure of his body.

Less than three months after these observations were made, Martin Lane was affected with an illness which was probably influenza. Pneumonia then set in and he was seized with a series of eclamptic attacks, in one of which he died. He was attended by Dr. Robinson, of Sonning, who most kindly informed me of his death and assisted me to make a post-mortem examination.

*Result of post-mortem Examination.*—Fat was present in ordinary proportions. The lymphatic glands of the anterior mediastinum were enlarged to the size of peas or small beans. in other parts they could be detected with difficulty. The lower lobes of both lungs and the middle lobe of the right were of a dark homogeneous plum-colour, and broke down easily on pressure with the thumb, exuding quantities of frothy serum. There were no signs of tuberculosis.

The heart weighed 241·5 grms. The mitral valves were crumpled and thickened with atheroma, but seemed to be fairly efficient. An old organised clot was present in the right ventricle and extended for some distance up the pulmonary artery. The wall of the ventricle round the coronary artery of the aorta was slightly atheromatous. A ductus arteriosus was present, but was not open.

The thyroid gland weighed 11·5 grms. Its two lobes were separate, no isthmus being present. Its structure was homogeneous, and on microscopic examination nothing abnormal was detected save a slight excess of interacinal fibrous tissue.

The brain weighed 1,275 grms. No abnormality could be detected. The hypophysis cerebri was examined and appeared to be in every way normal, but unfortunately through an oversight it was not weighed or taken away for microscopical examination.

The stomach and intestines were normal. The liver was not weighed. The kidneys weighed 220·4 grms. The suprarenal capsules weighed 3·5 grms.; the spleen, 92·25 grms.; the pancreas, 63 grms.

All the abdominal organs were examined microscopically and were found to be quite healthy, with the exception of the liver and kidneys, which showed some recent small-cell infiltration, evidently the result of the illness from which death resulted.

The testicles together weighed exactly 1 grm.; that on the right side was still in the inguinal canal, and was a little smaller than the left, which was descended. A section of the left testicle was kindly examined for me by Mr. McAdam Eccles, who reported that there was no evidence of abnormality beyond the extreme delay of development; the organs resembled those met with in childhood.

The several parts of the sternum were still separated by cartilage, and there was a small ossification-centre in the ensiform cartilage; the ribs showed no beading. The clavicles were fully ossified, and their muscular prominences were fairly well marked.

In the skull the frontal suture was obliterated, and the different pieces of the temporal and occipital bones were fused together, but the basi-sphenoid and basi-occipital were

ununited. The os innominatum was still divided into its three constituent bones by thin lines of cartilage. The lower epiphysis of the tibia was separated from the diaphysis by a thin line of cartilage. A piece of this was afterwards examined under the microscope.

*Microscopical Characters of Zone of Ossification.*—A section through the epiphysial cartilage of the lower end of the left tibia when compared with Paltauf's description of the epiphysial cartilage in his case shows the following characters:—The cartilage extends under the periosteum on the epiphysial side to such a distance that it probably embraces the whole of the ossified part of the epiphysis. The periosteum is, perhaps, a little thicker than normal. A section of a zone of ossification showed a more irregular distribution of columns and islands of encapsuled cartilage-cells than is usually seen. These were embedded in a somewhat fibrous and petrified matrix. Roughly speaking, the appearances were those of the ossification of youth combined with the calcification of old age.

*Case described by another Writer.*—Dr. Schmidt,[1] of Munich, has published a description and portrait of a girl, 16 years of age and 1·160 m. high, who was of average stature for the first half of her life. She was then severely ill for a fortnight with a disorder of which no details were obtainable. From that time growth almost ceased, for at the most she did not increase more than 5 cm. in height. At 16 years she looked like a girl of 8. She was of good intelligence and fairly muscular. There were no signs of the approach of puberty. The case was described before the days of skiagrams. Dentition was much delayed.

## GENERAL DESCRIPTION AND DIAGNOSIS OF ATELEIOSIS.

The asexual form of ateleiosis which the above cases illustrate is a species of infantilism, but it should be clearly understood that the disease is in no sense synonymous with the latter. The word infantilism has been much used by French writers to signify retarded, or arrested, development of the whole body. It is not a disease, but a condition, or symptom; and is to development what dwarfism is to growth.

[1] "Zur Kenntniss des Zwergwuchses," *Arch. f. Anthrop.*, Bd. XX., 1891, s. 39.

Infantilism is one of the features of cretinism and congenital syphilis. It may also be associated with hydrocephalus and other developmental disorders of brain, with congenital heart-disease, with imperfect development of the sexual organs, and with defective action of the pancreas (Byrom Bramwell) or other abdominal organ. Dr. Bryant has shown me notes of a case in which it occurred in conjunction with muscular dystrophy, and I myself have seen it in patients affected with achondroplasia, and Raynaud's malady. It is not always possible to say whether it is caused by the disease with which it is associated or not. Probably in most instances the relation is not one of cause and effect. The two disorders, then, furnish examples of the rule that two or more vices of development are prone to occur together. Sometimes it would be an abuse of language to term infantilism a disease, though it may be on the borderland between health and disease. Sometimes it is apparently no more than a natural variation—an extreme degree of a normal irregularity. We recognise that growth varies greatly, and that it sometimes becomes excessive without being morbid. Just in the same way as there are normal giants, so there may be normal dwarfs; and in some of these dwarfs there is not only delay or arrest of growth, but also of development. These constitute instances of normal infantilism. I am indebted to Mrs. Keith and Miss Keith for permission to examine one of the most striking cases of this condition which I have yet seen. It serves admirably to show the differences between simple infantilism and ateleiosis.

This case was that of a girl of fifteen years and a half, whose stature was no greater than that of a girl of six, whose ossification and dentition corresponded with that of a girl of eleven, and whose sexual development was not more advanced than that which is usual at twelve. Though there appeared to be no cause for this condition it could be distinguished from the cases of ateleiosis which have been recorded in the following particulars:—There was no special type of face; the girl resembled her mother in appearance. The proportions of the body were adult rather than childish, the middle point being at the pubic symphysis, while the extremities were comparatively long. The intelligence was fully equal to that of most girls of her age. Though the

condition had been first noticed when she was between two and three years old, the delay of development was not very conspicuous; and, above all, the pelvis and sexual organs were by no means infantile.

The salient features of ateleiosis and those which distinguish it from other diseases are as follows. It has a somewhat abrupt onset, so that parents are able to say at what age development seemed to stop. As a rule it appears without any evident cause. It may begin at any of the developing years of life. When it begins during infancy or early childhood, a characteristic physiognomy results. The face is broad and flat, the nose *retroussé*, while the relative size and conformation of the head are childish. The intelligence is unaffected, unless the disease begins during early fœtal life, when the delayed development of the very immature brain may give rise to imbecility. The delay of development is very pronounced, though it is not quite so conspicuous in the bones as it is in the height, proportions, and facial appearance. Growth and development may continue up to middle age. The muscular strength is in correspondence with the height. The general health is unaffected.

Dentition is often greatly retarded. Milk-teeth sometimes persist up to the age of 25 or even later, but as a rule dentition is much in advance of the general development. In fact the delay of development is not uniform. Probably the sexual system is more affected than any other, for in nearly every case it is described as infantile or childish, even when the skeletal development has arrived at the period of youth.

## PATHOLOGY.

There is no evidence that the thyroid gland, the pituitary body, the pancreas, the brain, heart or any other organ is the seat of origin of ateleiosis. In most of the cases which are recorded no relative increase or decrease in size, nor any morbid condition, of any of the organs could be detected. The defective condition of the sexual organs might be suspected of being the cause of the infantilism or feminism of ateleiosis. But we know that while, on the one hand, removal of the sexual organs in childhood does not lead to ateleiosis, on the other, ateleiosis may exist with sexual maturity. It

## Plate LXXXI.

*Fig.* 8.

*Normal Infantilism.* Girl of $15\frac{1}{2}$ (on the right) compared with normal girl of $5\frac{1}{2}$. In ordinary Infantilism there is no peculiar type of face, while the delay of development is not so abrupt or conspicuous as it is in that special form of Infantilism which is termed Ateleiosis. Note that in this case though the stature is about 10 years behindhand, the carriage, facial expression, proportions of the body, and development of the pelvis and sexual organs are not far short of those which are usual in girls of her age. *See* page 817.

is possible again that hypoplasia of the skeleton might account for the general hypoplasia, for just as in rickets the arrested growth of the skeleton leads to corresponding arrest of growth of nearly all the soft parts, so in ateleiosis it may be that defective development of the skeleton leads to a similar defect of development of the muscles and other organs. But the fact that the development of the skeleton is often in advance of that of all other parts seems to negative such a view. We only know that in ateleiosis there is defective development of the whole body, and that this is often preceded by hypoplasia of the sexual organs and is prone to be associated with some developmental anomaly of other parts. But there is no evidence showing to what this abnormal delay of development is due.

# SOME POINTS OF INTEREST IN THE CLINICAL MANIFESTATIONS OF CEREBRAL ABSCESS.

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That the diagnosis of cerebral abscess is frequently a matter of great difficulty, no one, I think, will be found to deny. We have, on the one hand, to differentiate it from thrombosis of the cerebral sinuses, and, on the other, from mastoid disease. At the same time its symptoms may resemble those of cerebral tumour or of inflammation of the membranes covering the brain. At first we rely, as a rule, on localised pain, vomiting, rigors, and drowsiness; while, if a history of chronic otorrhœa is obtained, we are less likely to be led astray. Later on, the slowing of the pulse and respiration, associated with an increase in the drowsiness and with loss of energy of mind and body, is significant. Paralyses of various kinds may be met with, while optic neuritis may, or may not, be present. As the case nears its termination, the gradually-increasing mental hebetude deepens into coma, and the patient dies.

While the above brief description gives a fairly accurate clinical picture of cerebral abscess, still there are cases which manifest themselves in such a manner as to lead the physician astray, or at all events to cause him to overlook the real nature of the case. In this connection it may be of interest if I give the history of a case which came under personal observation some time ago.

The patient was a male, æt. 59. What struck me at once on looking at him was his extreme emaciation. This was so marked that I had some tubercular condition in my mind as the diagnosis. His friends told me that he had been getting very much thinner within the last three months, but that he had never been very stout. He had always been very healthy until four months before, when he had an attack of what I think might fairly be described as influenza. Since then he had "gone off his food," and seemed to lose all his former energy.

On examining the chest I found the lungs perfectly normal. The heart likewise was normal though somewhat feeble in action. The pulse was 70, and the respirations 18 per minute. The abdomen was greatly emaciated, but there was no history of diarrhœa or constipation. No tumour could be felt on palpation. Examination of the urine gave negative results. There was no headache, and nothing to suggest any gross lesion in the nervous system. On the whole I was inclined to regard the case as one of post-influenzal marasmus, and put him on a mixture containing strychnine. I also ordered malt and cod-liver oil. In the meantime I made a careful examination of the blood, but nothing abnormal was detected, all the elements being well up to the normal standard.

During the first week of treatment he seemed to improve somewhat, and began to have a better relish for food. Now, when I come to think over the case in the light of the sequel which I am about to relate, I realise that the patient was somewhat slow in answering questions; but at the time I attributed this to his weak condition. On the tenth day after I first saw him, I noticed twitchings in the right hand. On taking his temperature I then found it slightly raised (99°·5 Fahr.). His breathing was also slightly laboured, and he was very stupid and apathetic. I examined his urine, but could find no trace of albumen or sugar: the specific gravity was likewise normal. Fearing that the twitchings might be due to the strychnine-mixture which he was taking, I stopped it altogether. Next morning I was sent for hurriedly. I found him moribund, the breathing being of the Cheyne-Stokes' type, and he died later on in the day.

As the case was so obscure, permission was asked to have a post-mortem examination of the body, and this request was readily granted. I need not pause to mention the condition of the various organs, as none of them presented any considerable degree of morbidity except the brain. There was no meningitis, but the frontal convolutions were greatly flattened. On section a fairly large abscess was discovered, occupying the posterior part of the left frontal lobe. No doubt this was due to infection by the influenza-bacillus.

This case, I think, presents certain points of interest. In the first place abscesses in the frontal lobes are comparatively

rare; an estimate of 5 per cent. of all cases would be, I think, well within the numerical limit. Then, again, the almost entire absence of symptoms is significant. There was, it is true, extreme emaciation, but this is frequent after severe attacks of influenza. Any lack of mental and bodily energy present might well have been attributed to post-influenzal weakness. The presence of twitchings, which may or may not (probably not) have been due to the administration of strychnine, was the only sign of lesion of the nervous system; and this only occurred on the day previous to the patient's death, so that it did not allow of a full and sufficient clinical observation being made. Looking back on the case in the light of the post-mortem examination, I fail to see how I could have treated it otherwise. Of course, had abscess been diagnosed, operative interference might have saved the patient's life. I merely record this case to show how important sometimes is a post-mortem examination in revealing altogether unsuspected lesions, and also to prove the value of not trusting too firmly to the routine symptomatology of morbid conditions given in text-books.

Another of my cases may also be referred to in proof of what I have stated. In this case the patient was a man of seventy years or thereabouts. I was asked to see him on account of "sore eyes." On examination I found him suffering from purulent conjunctivitis with blepharitis of the right eye, and some eczematous patches on the right lower eyelid and upper lip. His daughter attributed the condition to a "chill" which patient received while walking about some days before. There was no facial paralysis present. Heart and lungs were fairly healthy, but there was slight bronchitis present. The one feature that attracted my attention most was his extreme emaciation. I questioned his daughter very closely on the subject, but could get no very definite information beyond the fact that the patient did not take his food at all well. I ordered him some spt. amm. arom. and did not see him again for three days.

At my next visit the patient complained of pains in his knees and thighs. He was perspiring a good deal, and his temperature was 99°, while his pulse was 100. As a disagreeable odour was present about the bed, I questioned

his daughter, who informed me that both urine and fæces had been passed under him, probably during the night. As the patient complained of feeling drowsy, I examined the urine, but found nothing abnormal. I ordered strychnine and spt. amm. arom. to be given alternately. On the following day he complained of severe pains in both ankles. The temperature was normal, but the pulse was still rapid. Towards evening he became somewhat delirious, and was with difficulty kept in bed. He now complained of pains in the head. Next day his temperature was 99° and his pulse-rate 104. His face was somewhat swollen, and on testing the urine a trace of albumen was detected. I ordered 30 grains of pulv. jalapæ co. This produced some watery stools, and he gradually began to improve. He became quite sensible, and but for slight headache he seemed fairly comfortable. The temperature and pulse were now almost normal.

He continued in this condition for three days, but on the fourth he suddenly became very deaf. He also had twitchings in the right hand, and lay in bed with the right leg drawn up and flexed at the knee. He complained greatly of pain over the left side of the head, and was constantly putting his left hand over that region. That same evening I found him almost unconscious, with a temperature of 101° and a pulse-rate of 108. From that time Cheyne-Stokes' breathing set in, and the patient slowly sank, dying at 2 a.m., some eight days after my first visit. Just before death the temperature registered 99° and the pulse-rate rose to 112.

I insisted on having a post-mortem examination of the body, on the ground that I could not certify the cause of death without it. The report of this I shall give very briefly.

There was slight rigidity and faint lividity of the body. The heart showed diffuse chronic thickening of the pericardium. There were some patches of atheroma about the aorta and anterior mitral cusp; and there was considerable brown atrophy of the heart-muscle.

Both lungs exhibited hypostatic congestion, with some pneumonic patches along their posterior margins.

The kidneys showed slight interstitial inflammation, with some atrophy of the cortex.

The other abdominal organs were in a comparatively healthy state. There was no disease of stomach or intestines.

On opening the skull, the dura mater was universally adherent to the bone, especially over the frontal lobes. There were some adhesions of the under surface of the left temporo-sphenoidal lobe to the roof of the tympanum. When these adhesions were separated, some foul-smelling pus was evacuated from a cerebral abscess which was present in this situation. The convolutions over the vertex were greatly flattened, especially on the left side. On section a cavity about an inch in diameter was seen occupying the left temporo-sphenoidal lobe. The basal sinuses were healthy. Examination of the petrous bone and of the tympanic cavity revealed nothing to account for the presence of the abscess to which death was undoubtedly due.

On looking at the case from the point of view of the post-mortem examination, one is apt to wonder at the fact that no ear-condition was found. The patient's deafness might well have been due to middle-ear disease, but none was present. In fact I incline to the belief that the cerebral abscess, unless it had been present for some time without giving rise to symptoms, was the result of a catarrhal cold which the patient contracted about a fortnight before his death. If this be so, and I think it is highly probable, it is also possible that the bacillus of influenza was the cause of the mischief in this case as well as in the one first recorded. It is well known that this bacillus has a marked tendency to invade the brain and its membranes, cases of influenzal meningitis being not at all uncommon during epidemics.

The points which I wish to emphasise in connection with these two cases are as follows :—

(1) *The rapid Onset and rapid Termination of the Disease.* —It is just possible that a cerebral abscess may be present for some time before giving rise to any symptoms. This may have been so in the first patient's case, but I think this is very improbable in that of the second.

(2) *The Ambiguity of the Symptoms.*—The presence of twitchings, mental inactivity, and drowsiness might well have been due to renal disease, more especially as slight albuminuria was present in one of the cases. In both, however, the symptoms

failed to point definitely to cerebral abscess. This is greatly to be regretted, as surgical interference might have been successfully employed in both cases.

(3) *The Presence of Emaciation.*—I do not think this sign is sufficiently emphasised in the ordinary text-books. When one sees a patient in a state of extreme emaciation, malignant or tubercular disease more readily suggests itself than the presence of a cerebral abscess. Yet in both of my cases the one feature which was most prominent all through was the extreme emaciation of the patient.

(4) *The Importance of a Post-mortem Examination in obscure Cases.*—It is impossible to over-estimate its value in cases such as these. Without it I could not have definitely certified the cause of death in either case.

I trust that the publication of these two cases may be of some little help towards a more thorough understanding of what is so often a very obscure and undiagnosed condition.

# THE SURGICAL TREATMENT OF NEPHRITIS.

## A REVIEW OF RECENT PROGRESS IN GENITO-URINARY SURGERY.

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A FEW years back an attempt to collect material to illustrate surgical intervention in any form of nephritis would have been fruitless. The only cases recognised as surgical were those referred to the surgeon as a reproach on his art, and termed surgical kidney, not from any hope of operative relief, but to signalise a failure in his methods which he was impotent to retrieve. Recently, however, the different varieties of nephritis have been attacked surgically, at first through errors in diagnosis, then hesitatingly on their own merits, and now with enthusiasm by a few surgeons. Incidentally some changes have taken place in our conception of the pathology of nephritis; or, more accurately, facts hitherto observed but considered insignificant have been elevated to a more prominent place in the pathology of the disease. The time, therefore, appears opportune, while we are still within sight of the earlier cases, to gather up a few of the more important papers and piece them together into something like a continuous account of the work already done. By so doing, attention may be drawn to the subject, gaps in its continuity made evident, and observations still unpublished brought to light.

### I.—SUPPURATIVE NEPHRITIS AND PYELONEPHRITIS.

Under this heading are included diffuse suppuration in the kidney, either from infection through the blood-stream or from ascending infection along the ureter.

*Retrospect.*—In 1901 Israel[1] thus summed up the position of the surgeon in regard to diffuse suppuration in the kidney. "Cases of pyelonephritis have, up to the present, been the object of surgical interference only when they have led to the

formation of pyonephrosis or to the suppuration of hydronephrosis. On the other hand, it has been believed that nothing further need be expected from surgical interference in those cases in which the disease has gone the length of producing scattered miliary abscesses throughout the kidney, without evidence of retention. Against such forms nephrotomy appears powerless, while nephrectomy, on account of the bilateral distribution of the disease in the majority of cases, is unjustifiable." Israel then related nine cases of suppurative pyelonephritis (four hæmatogenous, five ascending) in which he had successfully performed nephrectomy seven times, partial nephrectomy once, and nephrotomy once. He concluded as follows:—"Not only may a pyelonephritis leading to grave general infection be confined to one kidney, and therefore removed with success, but also conservative operations, such as nephrotomy and partial nephrectomy, must, on the ground of my experience, find a place in the therapy of pyelonephritic cases, since by nephrotomy I have been able not only to bring about complete recovery in kidneys which were riddled with miliary abscesses, but also to remove promptly the total suppression of urinary secretion."

Similar opinions have been expressed by Weir,[2] Pousson,[3] and Wilms,[4] and by Lennander,[5] who has collected the cases recorded in the literature and added five from his own experience. Cases are also recorded by Legueu,[6] Albarran,[7] Monad,[8] Routier,[9] Potherat,[10] and others.

*The Legitimacy of Intervention.*—Pousson collected 19 cases from the literature and added 4 personal observations, 23 cases in all, of pyelonephritis in which surgical intervention had been undertaken. Of these 18 recovered, 5 died (21·7 per cent.). In only 2 cases, however, could the fatal result be directly attributed to the operation. Of the other 3, one died six weeks, and another three months, after the operation, while in the third neither the date nor cause of death are stated. Seventeen cases were alive and in good health at the time of publication; one had required a nephrectomy. One of Pousson's cases was well after four years and another after 1½ years.

Pousson and Wilms both lay stress upon the importance of the variety of the infection in the prognosis of the case. The latter author says that the successful results are mostly

in infection with Bacillus coli communis. Only once, so far as he is aware, has recovery resulted where a mixed infection with Streptococcus pyogenes longus was present.* The mode of penetration into the kidneys, the previous condition of these organs, and the unilateral or bilateral distribution are other factors bearing on prognosis (Pousson).

A number of objections have been raised against operation in these cases :—

(1) It is said that *in many cases of renal infection the prognosis is relatively good* (Albarran). Pousson does not deny this, but he says that where kidneys in a state of chronic inflammation are attacked by the Bacillus coli communis and, above all, by the Streptococcus, the danger is pressing and medical treatment offers few resources. It is only in such cases presenting a grave general condition and considerable elevation of temperature, that he would operate. He believes that the question of surgical interference should be earlier discussed, and that operation would then become more efficacious.

(2) It has been objected that *infective nephritis is almost invariably bilateral*, and that the danger of surgical intervention is thus greatly increased. Pousson admits that this is so in the majority of cases, but he asks, "Is it the same at the beginning of the inflammation?" According to analogy with other paired organs, such as the eye, parotid, and testicle, it is possible for one to be affected alone. Elsewhere [11] the author states his belief that "this dogma of bilaterality is not impregnable, and that at the commencement, at least, the renal infection may be limited to a single kidney."

Goodhart [12] many years ago drew attention to the unilateral character of many cases of pyelonephritis. His cases, which were gathered from the post-mortem reports of Guy's Hospital, were all of the ascending variety, that is, they followed upon disease of the lower urinary tract.

Weir has collected 45 cases from the records of St. Luke's Hospital and the New York Hospital, in 6 of which the lesion was one-sided. Adding those to the cases collected by Mallet and Bazy, he obtained 71 well-defined acute cases of "surgical kidney," in 59 of which both organs, and in 12 only one organ was affected.

* Wilms probably refers here to Lennander's case (No. 2).

Israel recorded two cases of hæmatogenous infection of the kidney strictly limited to one side (one a metastatic deposit from a carbuncle, and the other from a furuncle), and two others in which the infection was so much more severe on one side than on the other that the affection of the second kidney was only discovered after extirpation of the first. All these cases recovered after operation.

Even if both kidneys are affected this does not constitute, to Pousson's mind, an absolute contra-indication to interference, for the operation upon one kidney may beneficially influence the disease in the other. Moreover, the cases of Gerster and Lilienthal[13] show that double nephrotomy in the same *séance*, or with some weeks' interval, may be practised with success.

Weir would consider it justifiable, "if the patient's condition should warrant it, in a case of acute septic invasion of the kidneys, to make, on one or both sides, an exploratory incision."

(3) A further objection which has been raised is the *difficulty in recognising the diseased side in unilateral nephritis.* Clinically, according to Pousson, it is exceptional not to get evidence as to which side is affected. The conclusion is aided by the presence of pain, tenderness on pressure, or enlargement of the organ, while cystoscopy may render assistance.

(4) In reply to the last objection, that *the second kidney may become affected after nephrectomy or nephrotomy*, Pousson points to his own successful cases.

## THE CHOICE OF OPERATION.

*Nephrotomy.*—In the cases collected by Pousson there is a slight advantage in favour of nephrotomy. In 17 cases of nephrotomy 3 died, while 2 out of 6 cases of nephrectomy died. Nephrotomy, Pousson believes, is the operation of choice in severe infections. "It is better to try and preserve the organ infected than to completely remove it. There always remains the resource of a secondary nephrectomy to which both Legueu and Albarran have had recourse." To aid the depletion of blood, and to express infectious material from the canaliculi, he advises the surgeon to submit the split kidney to a methodical massage. The careful washing of the calices and pelvis and the cut surface of the kidney with a weak antiseptic

solution is an important adjunct to the incision; but the indispensable complement is prolonged drainage of the pelvis.

Nephrotomy realises the sum of the three indications in the treatment of suppurative nephritis—depletion of the kidney, antisepsis, and drainage; and Pousson believes that, having regard to the slight operative mortality, it should be practised without too much delay in every case in which internal medication appears to be powerless.

Wilms considers that incision and scraping of the most apparent foci of disease is sufficient. In order to reduce the bleeding as much as possible he makes only a small incision in the convex border of the kidney, and with the fingers tears up the softened kidney-tissue towards each pole, a manœuvre which he characterises as "very successful." The pelvis is opened with scissors, and very little bleeding occurs.

Legueu performed nephrotomy in four cases, which were in the later stages of acute suppurative pyelonephritis, with the following results:—One died the same evening, one died six weeks after operation, one was not improved, and one only recovered after a secondary nephrectomy.

Before 1899 Israel closed the wound in the kidney with stitches after the nephrotomy. This he no longer practises.

In a case of acute right pyelonephritis (ascending) with miliary abscesses, Edebohls[16] performed decapsulation of the affected kidney. The patient recovered, but there was still pyuria at the time of publication.

*Bilateral Nephrotomy.*—Gerster performed bilateral nephrotomy at a single sitting in a case of miliary abscesses of the kidney, and obtained a successful result. Lilienthal incised both kidneys, with three weeks' interval between the operations, in a case of suppurative nephritis following tooth-extraction. The patient made a good recovery. In a case of bilateral hæmatogenous pyelonephritis Israel performed right nephrotomy, and ten months later exposed the left kidney in incising the left perinephritis. He did not, however, cut into the renal parenchyma.

*Nephrotomy on a Solitary Kidney.*—In a case of Israel's the right kidney had been removed eight months previously for tubercular disease. When suppurative pyelonephritis occurred in the left kidney with total anuria, Israel performed a successful

nephrotomy on the solitary left kidney. Until recently this surgeon considered that a kidney riddled with abscesses was past recovery and should be removed. After the successful result of nephrotomy in this case, however, he feels justified in trying the conservative plan of splitting the kidney.

In a case of "acute pyelonephritis and miliary abscesses of both kidneys complicated with chronic Bright's disease," Edebohls[15] removed the right kidney, and five months later performed decapsulation of the left kidney. The patient made an uneventful recovery.

*Nephrectomy.*—Albarran, who only operates if the condition is unilateral, declares his preference for nephrectomy. Legueu's opinions coincide with those of Albarran; he would only operate as a last resource. Pousson does not, however, share these views. Nephrectomy in these cases, he considers, is "useless and dangerous"—useless, because the incision of the kidney suffices to arrest the process; and dangerous, because the remaining organ is put at a disadvantage in case of blood-infection which may be in progress. If we had to deal, in all cases, with an infection strictly localised to the kidney nothing would be more justifiable than nephrectomy in removing the disease. Often, however, the renal lesion is only the result of the elimination of infective material taking origin in an organism infected throughout. Thus, when one kidney is removed, the other must undertake alone the work of purifying the blood charged with bacteria and their secretions.

Israel performed nephrectomy in seven cases of suppurative pyelonephritis with recovery in each case. His views have, however, been modified by the case of nephrotomy in a solitary kidney noted above.

*Partial Nephrectomy.*—Lennander recorded five cases in which he incised the kidney. In each of these cases he removed portions of the kidney—in one a piece the size of a cherry-stone; in another about one-tenth of the kidney; in a third the upper and a portion of the middle part of the kidney; and in two cases "the most severely affected part." Four of the cases recovered completely, but the fifth died. Wilms does not think that excision of the affected part of the kidney is necessary; nor is it advisable, for a tampon is required to arrest the bleeding which results, and this obstructs

drainage. Israel performed the operation in one case with success.

## II.—ACUTE AND CHRONIC NEPHRITIS (BRIGHT'S DISEASE).

*Retrospect.*— In 1896 Reginald Harrison[16] published a series of cases under the title, "A Contribution to the Study of some Forms of Albuminuria associated with Kidney Tension and their Treatment." The first case had been operated upon in 1878, and the symptoms which led to operation in two of the cases pointed to renal calculus, and in the third to renal suppuration. The following diagnoses were made after exploratory nephrotomy :—scarlatinal nephritis, nephritis from cold, and subacute nephritis, probably due to influenza. Mr. Harrison recognised that he had unwittingly operated upon three cases of nephritis, but, from the swelling and tenseness of the kidney, and the rapid and complete relief obtained in each case, he concluded that he had chanced upon a method of treatment of nephritis which might be expected to lead to far-reaching results. That Mr. Harrison felt the full burden of responsibility in suggesting a method which formed an entirely new departure in the treatment of Bright's disease, and that he saw in the splitting of the kidney a method of treatment applicable to all forms of renal inflammation, there is no doubt. The following extracts from letters from Sir William Roberts and Sir Thomas Grainger Stewart, to whom he submitted his paper before publication, are interesting, as indicating the views of those two authorities in regard to the value of Mr. Harrison's work.*

In November, 1895, Sir William Roberts wrote, "I believe it will be the starting-point of important things in the treatment of inflammatory affections of the kidneys." Sir Thomas Grainger Stewart regarded this as "a principle of treatment of very considerable practical importance, and one which I hope to be able to apply in practice from time to time." Mr. Harrison again discussed the subject in his presidential address to the Medical Society of London,[17] and added a case by Hœber, of Homburg, and another of his own (apparently

* I am indebted to Mr. Harrison for placing in my hands the correspondence in regard to his original paper, and also for permission to publish these extracts.

traumatic nephritis) in which he punctured the kidney in several places. Newman, of Glasgow,[18] in the following year recorded a case (No. 5) of renal colic, albuminuria, and anuria relieved by incision of the kidney. This case, he considered, lent support to Mr. Harrison's views.

This author had previously[19] recorded two cases of pain, hæmaturia, and albuminuria in movable kidneys relieved by fixation of the organ. To these he now added four others. These cases have been quoted as illustrative of the effect of nephropexy on nephritis; but such was not Newman's idea in recording them, for he carefully explained the method by which torsion of the pedicle had produced the symptoms.

In 1899 Edebohls, of New York,[20] described six cases of chronic nephritis in movable kidneys, and pointed out the therapeutic effect of nephropexy upon the nephritis. "The fortunate effects of three of these five cases influenced me to regard the chronic nephritis of the sixth as a new indication, additional to other well-recognised and admitted existing indications of nephropexy for movable kidney." This author elsewhere[21] quotes two cases in which Ferguson[22] performed nephropexy in acute or subacute nephritis.

Israel[23] reported a number of cases in which renal colic and hæmaturia were associated with chronic Bright's disease and were relieved by nephrotomy. This paper was severely criticised by Senator,[24] who accused Israel of an attempt to inaugurate a new surgical treatment for chronic Bright's disease. In his reply[25] Israel made his position quite plain. "I have never," he said, "had the intention of treating any form of nephritis with the knife, but my idea was solely the removal of painful and dangerous symptoms arising in chronic nephritis, namely, colic and hæmaturia. I have never operated upon any form of non-suppurative nephritis unless one or both of these symptoms were present."

In 1901 Edebohls[26] stated his intention "to go a step further and propose surgical intervention for the purpose of attempting a cure of chronic nephritis, whether the affected kidney be movable or in place." His method consisted in stripping off the renal capsule, and he published the results of his operations in several papers of later date.[27, 28] Other papers by Pousson[29-34] Harrison,[35] Mongour,[36] and Guitéras,[37] have

amplified the literature and increased the number of cases recorded.

THE CLASS OF CASES OPERATED UPON, AND RESULTS.

1. *Acute Nephritis.*—Harrison's cases were all, with one exception, examples of acute or subacute nephritis. He describes the first four as follows:—"The first was scarlatinal nephritis, the second nephritis from exposure to cold and damp, the third subacute nephritis probably following upon influenza, and the fourth nephritis further complicated with an injury." The fifth case reads like acute traumatic nephritis. The operations were undertaken on account of one or more of the following symptoms:—Diminished secretion of urine; pain, more or less severe, and either limited to, or more marked on, one side; hæmaturia, slight or recurrent. In all, the kidney was found extremely tense on exposure. This surgeon recommends operation in cases of acute nephritis in which convalescence is delayed and the albumen and casts do not disappear from the urine; also in cases such as the malignant type of scarlatinal nephritis where suppression occurs; and lastly, where a marked disturbance of the heart and circulatory apparatus arises in the course of inflammatory renal disorders. "The operation should be reserved for cases where there is evidence that the recuperative power of kidneys suffering from nephritis is outweighed." Operation is recommended, not only with the object of setting aside the dangerous symptoms, but also with a view to preventing the sequence of chronic nephritis. After operation in Harrison's cases and in one described by Newman the urine increased to normal quantity, the albumen and casts disappeared, and recovery in each case was complete.

Pel and Rosenstein,[88] although they condemn routine surgical treatment of acute nephritis, regard operation with favour in cases in which there is marked diminution of urine and medical treatment continues ineffectual.

2. *Chronic Nephritis.*—Two groups of cases have been subjected to operation:—

(*a*) Cases of chronic nephritis with severe or dangerous symptoms, such as renal colic, excessive hæmaturia, and uræmia. In these the operation was performed

with the object of removing the symptoms, or merely as an exploratory operation.

(*b*) Cases of chronic nephritis in which the disease was pursuing its usual course and operation was undertaken with a view to its cure.

(*a*) *Chronic Nephritis with severe or dangerous Symptoms.*—Israel relates that for ten years he had noted a number of cases in which stone was suspected, and the severe pain and failure of medicinal treatment in all cases led to operation. No gross changes, such as stone, growth, &c., having been found, he concluded, after carefully reconsidering his cases, that in a large number of cases of renal colic and hæmaturia, in which the recognised causes were absent, the symptoms were due to nephritis. In addition to this he noted the fact that bleeding and colic due to nephritis could be cured by nephrotomy.

Israel reports 15 cases in support of his views. In 11 of these chronic nephritis was proved, and in two there was reason to suspect the presence of this condition. In most of the cases the colic and hæmaturia ceased, and in some of them albumen also disappeared from the urine. In several there was a marked increase in the quantity of urine, which up to the time of operation had been diminished.

These results were by no means transitory: of the 11 cases still living, 6 had remained free from hæmaturia and pain; and in a seventh these symptoms disappeared from the side operated upon, but later reappeared on the opposite side. In 2 other cases, the colic disappeared for 1 and 1½ years respectively, and then returned. In only 2 cases was there no continued improvement.

Pousson has published 6 cases of operative interference in chronic Bright's disease with 2 deaths. These operations were only undertaken on account of grave symptoms of uræmia. This author says, "What shows the value of operation is the fact that they were only undertaken to remedy symptoms of Brightism of extreme gravity. My practice thus differs from that of foreign surgeons, who, with some rare exceptions, have operated at the onset, or during the course, of chronic nephritis in the hope of putting an end to the process."

The 4 patients who survived still showed considerable improvement at the time of publication. One case was completely well after 2 years and 2 months, and 2 others after 7 and 8 months respectively. In the remaining case, although the urine had returned to normal, the uræmic symptoms had not completely disappeared on leaving hospital.

Cases in which operations were successfully undertaken to relieve renal colic and hæmaturia in chronic Bright's disease are recorded by Hofbauer,[39] Keersmaecker,[40] Rovsing,[41] Potherat,[42] Albarran,[43] Schede,[44] Poirier,[45] Desmons,[46] and Peau.[47]

(*b*) *Operations undertaken to cure Chronic Nephritis.*—Edebohls operated at first upon chronic nephritis as a complication of movable kidney, and from the results he obtained he proposed to attack all cases of chronic nephritis with a view to cure. In his latest paper on the subject, this author states that he has operated upon the kidneys of 40 patients suffering from chronic Bright's disease—23 women, 1 child, and 16 men (6 of the latter being physicians). In 16 of the 40 more or less extensive decapsulation followed by nephropexy was the operation performed. In 4 of the 16 the right kidney alone was anchored, in 12 both kidneys were operated upon. Of the total 40 cases 3 cases disappeared from observation; in 6 cases the urine was normal, and the patient well at periods ranging from 2½ years up to 8½ years. One case was not improved. The remaining 30 cases were operated on too recently to state definitely the result of the operation. Edebohls does not, however, entertain the hope that chronic Bright's disease will yield to surgical treatment in *all* cases. In advanced stages of the disease many of the complications are in themselves necessarily fatal. Early operation is advocated; and it is pointed out that improvement can only take place gradually, and complete cure after the lapse of a considerable period of time.

Guitéras has described a case which supports the views of Edebohls. This author submits the following conclusions:—(1) That nephropexy is always a good procedure in a movable kidney in which chronic nephritis is present; (2) that nephrotomy has proved to be valuable in unilateral Bright's disease associated with hæmaturia and nephralgia; and (3) that

complete bilateral decapsulation has not as yet been employed extensively enough to warrant any positive conclusion as to its value.

### THE FORM OF OPERATION.

*Nephrotomy.*—In his earlier cases Mr. Harrison limited the operation to exposure and puncture of the kidney in one or more places. "Though this proved sufficient in cases where it was unnecessary to explore the interior of the organ for any other cause of congestion, there were others where a further search rendered a limited incision through the capsule advisable. On the whole I think that in the majority of cases the latter procedure is to be preferred. I speak of it as a capsular nephrotomy, indicating by this term the limit I would, as a rule, put upon the proceeding." Nephrotomy, according to the ordinary procedure, was performed by the other surgeons quoted above.

*Renal Decapsulation.*—This operation was introduced by Edebohls for the treatment of chronic Bright's disease. After exposure of the kidney the fatty capsule is everywhere separated from the organ until the pelvis is reached, the scissors and knife being used only when necessitated by perinephritis. The fibrous capsule of the kidney is now divided on a director along the entire length of the convex external border, and each half is stripped from the kidney until the surface of the organ is completely denuded. The fibrous capsule is then clipped away.

The operation becomes very difficult when the kidney cannot be delivered from the wound. The kidney is finally dropped back, and the external wound closed without drainage. Both kidneys should be operated upon at one sitting, the double operation taking one half to one hour.

### EXPLANATION OF THE RESULTS OF OPERATION IN BRIGHT'S DISEASE.

According to Harrison, the hæmaturia, pain, and suppression of urine which occur in nephritis are due to tension within the tough renal capsule. This tension leads, in addition to a slow extravasation of urine into the renal tissue, which is highly destructive. An analogy is drawn with increased tension in

other glands and organs of the body, and notably in the testicle (acute orchitis) and the eye (glaucoma). In these the relief of tension by operation is followed by excellent results, and in the same way capsular nephrotomy benefits nephritis. Mr. Harrison supports his views by post-mortem appearances in unoperated cases and the presence of tension in inflamed kidneys exposed during life, and he points to the success of splitting the capsule in removing the symptoms and bringing about a cure. Israel explains the results of his operations on similar lines.

Senator, however, does not believe that incision of these kidneys is necessary to reduce tension, and he agrees with Pel[6] that, if such tension really exists, the hæmaturia which occurs should in itself be sufficient to remove it. He does not admit that "nephralgia hæmaturica" is caused by nephritis.

In regard to the bilateral affection in acute nephritis, Harrison considers that operation on both organs need not be undertaken, for there is probably a reni-renal reflex, and, as his cases show, relief afforded to one kidney usually assists the other. Israel, on the other hand, believes that "there are one-sided nephrites. Apart from ascending nephritis, which is well recognised to be often unilateral, hæmatogenous inflammatory processes of the kidney, from in most cases unknown causes, may be unilateral."

Edebohls' explanation of the effect of decapsulation in chronic nephritis is shortly as follows:—The tough renal capsule proper proves an insuperable barrier to collateral circulation. If this barrier is removed, a free flow of blood through the kidney, which the diseased renal vessels were inadequate to supply, is promoted. By this means the increased interstitial tissue is absorbed, and deleterious pressure on the tubules removed, and a regeneration of the renal epithelium takes place.

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# Public Health.

## THE DEATH-RATES OF WORKING-CLASS COMMUNITIES.

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LAST year an inquiry was instituted in the metropolitan borough of Chelsea into the housing and vital statistics of certain selected populations representing the working class residing in the borough. Inasmuch as some of the selected streets contained only a small population, it was considered advisable to take a period of 10 years for the data necessary for the construction of the death-rates; consequently, the figures so given in the accompanying table represent average death-rates for the 10-year period 1893–1902. In this way fallacies arising in connection with paucity of data for small populations are to some extent avoided.

Two divisions of the working-class population were taken for the purposes of comparison, namely, (A) those residing in the ordinary working-class streets of the borough, and (B) those who inhabit industrial dwellings.

The 11 districts in A. comprise for the most part people who may be described as the lower wage-earning classes, but districts 1 to 4 are certainly inhabited by a class superior to those living in the districts 5 to 11. Amongst these latter are some of the lowest streets in the borough, inhabited to a considerable extent by casual labourers and others earning precarious wages. None of the 11 districts contain any common lodging-houses, which introduce a fertile source of fallacy, especially in respect of death-rates from phthisis, as it appears probable that phthisis causes a considerably higher mortality amongst inmates of common lodging-houses than amongst the bulk of the working classes.

Of the industrial-dwellings populations it may be said that No. 1 comprises a class somewhat higher in the social scale than any of the others, as may be seen by the fact that the majority of these people live in tenements of more than two rooms. Nos. 2 and 3 are artizans or superior labourers, whilst 4 and 5 are distinctly representative of the lower wage-earning

| — | Population. | General Death-Rate. | Zymotic Death-Rate. | Phthisis Death-Rate. | Other Tubercular Diseases Death-Rate. | Deaths under 5, Percentage of Total. | Percentage of Population living in | | | Average Number of Persons per Room. | Average Number of Persons per Family. | Average Rent per Room. | Children under 12, Percentage of Total. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | One Room. | Two Rooms. | Three Rooms and over Three. | | | | |
| | | | | | | | | | | | | s. d. | |
| A. Districts:— | | | | | | | | | | | | | |
| No. 1 - | 739 | 20·4 | 4·1 | 2·2 | 0·8 | 48 | 1 | 9 | 90 | 1·4 | 4·2 | 2 1 | 36 |
| „ 2 - | 279 | 26·5 | 4·7 | 2·9 | 0·7 | 36 | 22 | 48 | 30 | 1·7 | 3·4 | 2 8 | 39 |
| „ 3 - | 496 | 26·8 | 5·4 | 1·8 | 1·4 | 50 | 19 | 71 | 10 | 2·4 | 4·4 | 2 8 | 45 |
| „ 4 - | 279 | 28·3 | 4·7 | 3·2 | 0·4 | 24 | 23 | 50 | 27 | 1·6 | 3·3 | 2 11 | 32 |
| „ 5 - | 299 | 36·4 | 6·4 | 3·3 | 0·7 | 46 | 6 | 74 | 20 | 1·9 | 3·9 | 2 8 | 36 |
| „ 6 - | 419 | 36·5 | 6·2 | 3·8 | 0 | 43 | 4 | 64 | 32 | 2·0 | 4·5 | 2 6 | 42 |
| „ 7 - | 142 | 38·7 | 6·3 | 2·8 | 1·4 | 60 | 24 | 51 | 25 | 1·8 | 3·4 | 2 6 | 35 |
| „ 8 - | 667 | 38·8 | 8·1 | 4·5 | 1·9 | 49 | 4 | 33 | 63 | 1·7 | 4·0 | 1 10 | 39 |
| „ 9 - | 188 | 42·0 | 12·8 | 6·4 | 1·6 | 57 | 7 | 42 | 24 | 2·0 | 4·6 | 2 4 | 42 |
| „ 10 - | 226 | 42·9 | 8·0 | 8·8 | 1·3 | 40 | 34 | 55 | 38 | 2·0 | 3·3 | 2 4 | 35 |
| „ 11 - | 396 | 44·2 | 10·1 | 2·8 | 0·5 | 45 | 8 | 45 | 47 | 1·6 | 3·5 | 2 6 | 32 |
| B. Industrial Dwellings:— | | | | | | | | | | | | | |
| No. 1 - | 566 | 10·6 | 1·8 | 2·1 | 0·3 | 37 | 0 | 10 | 90 | 1·1 | — | — | — |
| „ 2 - | 450 | 16·7 | 3·1 | 2·0 | 0·4 | 32 | 0 | 33 | 77 | 1·6 | — | 2 0 | — |
| „ 3 - | 206 | 21·4 | 1·0 | 2·4 | 1·5 | 18 | 9 | 73 | 18 | 1·6 | — | 2 2 | — |
| „ 4 - | 940 | 24·4 | 4·9 | 2·3 | 1·6 | 51 | 16 | 38 | 46 | 1·6 | — | 2 1½ | — |
| „ 5 - | 165 | 30·3 | 9·7 | 0·6 | 2·4 | 52 | 22 | 37 | 41 | 1·7 | — | 2 6 | — |
| Chelsea Borough | 75,033 | 18·8 | 2·7 | 1·9 | 0·6 | — | — | — | — | — | — | — | — |

classes, but casual labour is probably not largely represented amongst them.

*General Death-rate.*—It has not been possible to make corrections for age- and sex-distribution; but having regard to the fact that the various populations contain very similar classes of the community, namely, working-class families without servants, the rates may be used for comparative purposes without the risk of serious error. Whilst in the borough generally the death-rate was 18·8 per 1,000 per annum, it varied in A. districts between 20·4 and 44·2, and in the industrial dwellings between 10·6 and 30·3.

*Zymotic Death-rate.*—Similarly, whilst the death-rate from zymotic diseases (Measles, Scarlet Fever, Diphtheria, Whooping-Cough, Enteric Fever, and Diarrhœa) in the borough was 2·7, it varied in A. districts between 41·1 and 12·8, and in the industrial dwellings between 1·0 and 9·7.

*Phthisis Death-rate.*—The borough death-rate from phthisis being 1·9, the district death-rates varied between 1·8 and 8·8, and the industrial-dwellings death-rates between 0·6 and 2·4. The death-rates from other tubercular diseases are not very reliable; and, presenting, as they do, some unaccountable discrepancies, had better be neglected.

Other columns in the table show the percentage of each population living in tenements of one room, of two rooms, and of three rooms and over three rooms. The average number of persons per room, the average number of persons per family, the average rent per room, and the percentage of each population formed by children under 12 years of age are also shown.

A careful study of the figures in these subsidiary columns does not show any definite relation between the facts there stated and the death-rates of the various populations. It might have been supposed that the populations having the largest percentage living in one-room tenements would have the highest death-rates, but this is clearly not the case as regards the A. districts; nor is there any such connection between high death-rates and the percentage of the population living in one and two-roomed tenements.

It is difficult also to trace any connection between overcrowding (the average number of persons per room) and high death-rates. Compare, for instance, districts 3 and 8. In these

two districts the populations are very similar, and the cubic capacities of the rooms are not dissimilar; yet district 3 has 2·4 persons per room, a general death-rate of 26·8, and a phthisis death-rate of 1·8, whilst district 8 with only 1·7 persons per room has a general death-rate of 38·8, and a phthisis death-rate of 4·5. Neither do high death-rates appear to be especially associated with large families, or with a large percentage of children under 12 years.

From a personal knowledge of the various districts I may say that I am unaware of anything in the structure of the houses, or of the general sanitary conditions, that would account for the discrepancies displayed between the general and special death-rates of the various A. districts.

A review of the facts as above set out, fortified by an experience of 12 years as a Medical Officer of Health in London, leads me to the belief that high death-rates are always very largely due to social and economic conditions. The habits of life of the classes who depend upon unskilled labour to earn a precarious livelihood are conducive to disease and high mortality. These habits are fostered by a low standard of living, and are not eradicated by such educational training as the lower classes obtain in their childhood and early youth. The uncertainty of living and the precariousness of earning a livelihood are undoubtedly strong factors in the formation of modes of life inimical to health and longevity. Contrast the death-rates of population No. 4 of the industrial dwellings (one of the Guinness Trust Buildings) with those of any of the districts 5 to 11, containing a similar class of people. The figures are wholly in favour of the Guinness buildings; and this is so because the people here, although poor, are for the most part in receipt of steady wages, and they are obliged to conform to certain regulations which induce habits of steadiness and self-control. The working classes living in well-regulated industrial dwellings have lower death-rates than those who reside in ordinary tenement-houses, partly because they are a select class who are willing to abide by certain sanitary rules, and partly because the rules of nearly all the industrial-dwelling companies tend to eliminate those who are not steady wage-earners. The rents in the industrial dwellings are generally lower than in the surrounding neighbourhoods, and the tenants probably earn no more

than they did before they became tenants of the dwellings; but their wages are more generally applied to proper uses, and this is the real secret of the healthiness of the dwellings.

The demolition of insanitary areas does not directly tend to lower the death-rate of a community, if the result of the dishousing of the population is simply a displacement of people with insanitary habits, who are absorbed into the surrounding population. The habits of these people may possibly be improved by their expulsion from such an area and their enforced lodgment amongst a better class. On the other hand, such people may (and actual examples are known) by their influence deteriorate the population amongst whom they go, and tend to the creation of new slums in a fresh neighbourhood. If, however, the cleared area is used for the erection of industrial dwellings, then there will be a tendency to a lowering of the general death rate by the creation of a favoured population.

To improve the general health of the labouring population a very great variety of measures are necessary. Some of the more important desiderata may be enumerated as follows:—(1) Improved education, and especially the instruction of the young in the principles and practice of personal hygiene; (2) an improvement in the condition of unorganised, unskilled labour. Better and more regular wages would enable these people to adopt that higher standard of living which an improved education would have placed as an ideal before them. The unrestricted immigration of aliens in this country appears to be answerable to some extent and in some localities for the failure of unskilled labour to participate in the benefits which have fallen to the lot of the skilled and the organised; (3) the spread of temperance; and (4) the inducement to thrift which would be promoted by a well-considered scheme of old-age pensions.

With the spread of education, and the attainment by all classes of the community of a desire for a higher standard of life, there will be an ever-increasing demand for better and more sanitary house-accommodation. This must be provided by private, aided by municipal, effort; and, where necessary, slums must be cleared away to provide the sites for improved dwellings. The provisions of the Housing of the Working Classes Act for dealing with insanitary areas are notoriously defective. The procedure is cumbrous, dilatory, and enormously

expensive, and in consequence these sections of the Acts are almost a dead letter.

Much has been done to improve the condition of the working classes, but much more still remains to be done. Who can say that further effort is not required, when we know that certain sections of the population have death-rates four times as high as some of their more favoured fellows, and that these high death-rates are largely due to excessive mortalities from zymotic diseases and phthisis—diseases which are largely preventable if the proper means to prevent them were available.

A large majority of the municipalities throughout the country are actuated by a desire to do something to improve the sanitary condition and housing of the labouring classes within their spheres of control; but such measures as are undertaken must not put too heavy a burden upon the rates. Schemes for the erection of working-class dwellings under Part III. of the Housing of the Working Classes Act are looked upon with favour where land can be acquired at a reasonable price, because such schemes soon become self-supporting; but the clearing and acquisition of condemned areas under Parts I. and II. are processes attended by such a piling up of costs that the authorities of most of the large towns, where such action is requisite, are agreed to hold their hands until the process is much simplified and cheapened. Only those cities which have local Acts in force, enabling clearances to be made, are in a position to move in the required direction. Public opinion is not now in favour of clearances of insanitary areas unless reconstruction can be undertaken so as to re-house a portion at least of the displaced population on or adjoining the cleared sites. There is generally already an insufficiency of working-class houses in most centres of population, and the demolition of existing dwellings increases the evil of overcrowding in the surrounding areas, however desirable it may be to do away with houses of a type which cannot be made healthy or maintained in a sanitary condition. Demolition unaccompanied by reconstruction merely creates an acute phase of the housing problem, and naturally local authorities are very much averse to such action, although in Parliament their inactivity is often misunderstood and attributed to inertia instead of to the real cause—defective legislation.

# Reviews of Books.

*Archives of Neurology:* from the Pathological Laboratory of the London County Asylums, Claybury, Essex. Edited by FREDERICK W. MOTT, F.R.S., M.D., F.R.C.P., Director of the Laboratory, and Pathologist to the London County Asylums; Physician in charge of Out-Patients, Charing Cross Hospital. Vol. II. London: Macmillan and Co. 1903.

THE second volume of the *Archives of Neurology*, edited by Dr. Mott, is a worthy continuation of the work so admirably begun in the previous issue, and affords interesting evidence of the success which has attended a much-debated project of the London County Council. That the establishment of the Pathological Laboratory at Claybury has been more than justified is amply proved by the work already published by the Director and his brilliant *coterie* of assistants. In the present volume the most important contribution, occupying more than 300 pages, is from the pen of Dr. Mott himself, and deals with Tabes dorsalis as met with in asylum and hospital practice. The writer repeats and enforces his well-known views as to the relation of the disease to syphilis, and the practical identity of the pathological processes in Tabes and General Paralysis of the Insane. An interesting table is given showing the different percentages calculated by a number of writers as to the preëxistence of syphilis in patients suffering from locomotor ataxy; and it is noted that, as the subject becomes more familiar, so the weight attributed to syphilis in the causation of the malady tends to increase. The whole paper constitutes a valuable monograph on tabes, founded on an extensive clinical and pathological material. A study of the *Pathology and Morbid Anatomy of Juvenile General Paralysis* by Dr. G. A. Watson affords confirmatory evidence of Dr. Mott's views as to the syphilitic or parasyphilitic nature of this condition. Dr. Mott also contributes papers on the Prevention of Dysentery in Asylums, on the Choline

test for Degeneration of Nervous matter *intra vitam*, and (with Professor Halliburton) on the Coagulation-temperature of Cell-Globulin and its bearing on hyperpyrexia.

The articles by Dr. Tredgold on Amentia (Idiocy and Imbecility), and by Dr. J. S. Bolton on the Histological basis of Amentia and Dementia, contain much valuable work. Dr. Tredgold insists that heredity plays a part of hitherto unrecognised predominance in the production of idiocy and imbecility. His conclusions would have greater force if they had been based on a larger number of cases than 150, but we cannot fail to acknowledge the care and thoroughness with which they have been prepared and analysed.

We have not space to do more than indicate the titles of the remaining papers in this volume, all of which maintain a high standard of importance. Dr. W. G. Smith deals with the fascinating, if difficult, subject of Memory and Association; Dr. Charles Bolton with Changes in the Medulla in acute Diphtheritic Toxæmia; and Dr. S. J. Cole with an examination of the Nervous and Muscular Systems in acute Alcoholic Paralysis. In conclusion it may be said that the entire collection bears the impress of the Editor's robust common sense, sound judgment, and capacity for detail — qualities which Dr. Mott is evidently capable of instilling into his collaborators. We heartily congratulate him and them on the present volume, and can wish nothing better for future issues of the *Archives of Neurology* than that they may continue as they have begun.

*Practical Handbook of the Pathology of the Skin.* An Introduction to the Histology, Pathology, and Bacteriology of the Skin, with special reference to Technique. By J. M. H. MACLEOD, M.A., M.D., M.R.C.P., Assistant in the Dermatological Department, Charing Cross Hospital: Physician to the Skin Department, Victoria Hospital for Children. Demy 8vo. Pp. xxiv and 408. With 40 Plates. London: H. K. Lewis. Price 15s. nett.

ACCORDING to the author's preface this handbook is intended primarily for students of dermatology, presumably for those who intend to specialise in this department of medicine; but it will form a very useful book of reference for all those

who are interested in the study of histology and pathology generally, since it contains much information on those complicated methods of preparing and staining tissues for microscopic examination which might with advantage be applied to other parts of the body. It has often been made a reproach against dermatology that, though the skin is the portion of the whole human frame most easily observed, yet it was a field in which less, perhaps, was accurately known than in any other branch of medicine. We are not prepared to say that this gibe is even now without some foundation in fact; but at least it must be owned that the darkness which still enshrouds the subject is not due to any deficiency of ardent and enthusiastic work by the numerous army of researchers in the field. Dr. MacLeod's book bears testimony to the amount of such work. It contains an immense number of formulæ for the various stains and methods of research which have been devised for the purpose of investigating pathological processes occurring in the skin. As a result of modern researches, we find that the morbid anatomy of cutaneous lesions is fairly well established, a formidable array of special degenerative processes being traced in the skin, each of which is picked out by its particular staining reagent. When, however, we enquire into the pathology proper of the skin—the relations of the various lesions to different causal agents and the ways in which they are produced by them—we are obliged to confess that the darkness is not much illuminated by recent investigations. In scarcely any even of the commoner diseases of the skin is the question of ætiology definitely settled. To take as examples eczema and psoriasis, little or nothing appears to be really known of the mode of causation of either malady. Still, there can be no doubt that the surest foundation for any future knowledge must rest on an accurate study of morbid anatomy, and that at least is satisfactorily ascertained. In this respect Dr. MacLeod's book is most interesting, and to be cordially recommended to all students of medicine. Dealing as it does with methods of research and the results of these methods, it sets out in an admirably clear way the morbid changes which the different layers of the skin undergo, giving as examples the various diseases in which these changes

are to be met with. They are made intelligible even to those who are not already acquainted with this branch of pathology by means of a very large number of beautiful illustrations, upon which both the author—who is his own artist—and the publisher are to be highly congratulated. We had previously had cause to fear that our native text-books could not hope to compare in the matter of illustrations with those produced in America. The book before us sufficiently refutes this suspicion. We venture in conclusion to suggest to the author that the word "hyaline" is well established in the English language, and should not be docked —*à l'Américaine*—of its final "e" as is done throughout this book ("hyalin degeneration"). A degeneration of tissue does not call for a degeneration of language for its description.

## SOME TEXT-BOOKS OF BACTERIOLOGY.

*The Principles of Bacteriology. A Practical Manual for Students and Physicians.* By A. C. ABBOTT, M.D., Professor of Hygiene and Director of the Laboratory of Hygiene, University of Pennsylvania. Sixth Edition. Demy 8vo. Pp. 64. With 111 illustrations, of which 26 are coloured. London: H. K. Lewis. 1902. Price 12s. 6d.

THE rapid sale of five editions and the appearance of a sixth within a period of twelve years affords ample evidence that this manual meets, and fills, a distinct want, despite its numerous rivals for popular favour. And the reason of its popularity is not far to seek, for the volume under notice is no dry compilation of facts, nor does it exhibit any slavish adherence to dogma. It rather presents such data, and these in such a form, as are best calculated to stimulate the student to think and reason for himself; and having done so, it induces him to apply the fundamental principles of bacteriology to his everyday medical work. The book throughout breathes the spirit of the practical teacher, describes practical methods, and teaches the student to find material for himself; and it gives practical suggestions as to how such material should be worked up. In the section devoted to pathogenic bacteria the carefully selected facts are presented clearly and accurately, as well as

in a thoroughly up-to-date spirit, the chapter on Immunity, particularly, presenting a lucid, moderate, and well-balanced *resumé* of the recent work on the subject. The section on bacterioscopic analyses, too, although short, conveys a good idea of their scope and the inferences to be drawn from their results. In short, Abbott's *Bacteriology* is one that can be confidently recommended to the intelligent student, and equally so to the practitioner who wishes to appreciate the bearings of bacteriology on medicine.

*A Manual of Bacteriology.* By ROBERT MUIR, M.A., M.D., F.R.C.P. Edin., Professor of Pathology, University of Glasgow, and JAMES RITCHIE, M.A., M.D., B.Sc., Reader in Pathology, University of Oxford. Third Edition. Cr. 8vo. Pp. 548 + xxviii. With 150 illustrations. Edinburgh and London: Young J. Pentland. 1902. Price 12s. 6d.

MUIR and Ritchie's *Bacteriology*, the third edition of which we now welcome, has already become the standard text-book for the use of the medical student on this side of the Atlantic. In its general plan it differs markedly from the above-noticed volume by Abbott—being primarily intended for students and practitioners of medicine; it consequently only deals with those bacteria which are associated with disease in the human subject. Such non-pathogenic and saprophytic bacteria as are mentioned are merely referred to incidentally on account of their resemblance to pathogenic organisms or on account of their casual association with definite lesions due to the activity of other and virulent bacteria. The first portion of the book is devoted to a description of technical methods, all of which are reliable, up to date, and well described; and to the discussion of certain general subjects, such as toxines and antitoxines, antiseptics, the mode of action of bacteria, &c. The next and largest section deals with the many diseases occurring in man, which are known to owe their origin to bacterial activity; and here one cannot help being struck with the mass of information which is crowded into the small space of less than three hundred pages—information which is accurate, concise and precise, yet so agreeably presented as to leave the manual entirely free from the

taint of the "cram-book." The last hundred pages are devoted to a consideration of Immunity; and of such diseases as malaria, hydrophobia, and amœbic dysentery, which, although due to the presence of higher forms of life than those included amongst the schizomycetes, are frequently discussed between the same book-covers as the pathogenic bacteria. A carefully-selected bibliography, arranged under headings to correspond with the titles of the chapters into which the book is divided, and an excellent index largely enhance the value of the manual.

*A Manual of Bacteriology, Clinical and Applied.* By RICHARD T. HEWLETT, M.D., M.R.C.P., D.P.H. (Lond.), Professor of General Pathology and Bacteriology, King's College, London. Second Edition. Post 8vo. Pp. xx and 533, with 20 plates and 64 figures in the text. London: J. and A. Churchill. 1902. Price 12s. 6d.

ON looking through the second edition of Professor Hewlett's *Manual of Bacteriology*, we find that many of the chapters have been rearranged, enlarged, or entirely rewritten, so that the work now forms a handy manual of the bacteriological aspects of pathology. It includes, moreover, a most useful chapter on the life-cycles of the pathogenic protozoa, not only those affecting man, but also those which are parasitic in other mammals, birds and amphibia. There is further a particularly interesting chapter on hydrophobia, cancer, and small-pox. Some fifty pages at the end of the book are devoted to methods of bacteriological analysis. In one respect only we must own to a feeling of disappointment, in that, although four years have elapsed since the appearance of the first edition—four years which have been fruitful in improved methods and technique, and in a better appreciation of the needs and requirements of bacteria, when cultivated and observed under laboratory conditions—yet the early chapters of the book dealing with laboratory methods have undergone little or no change. Presumably the frequent reference to current research by his compatriots and continental bacteriologists, which forms a distinct feature of the book, has in the author's opinion rendered such revision unnecessary.

*The Elements of Bacteriological Technique.* By J. W. H. EYRE, M.D., M.S., Bacteriologist to Guy's Hospital. Philadelphia and London: W. B. Saunders and Co. 1902. Pp. 371. Price 10s. 6d. nett.

DR. EYRE has compiled a book which will be of the greatest service in the laboratory. It is profusely illustrated, so that the descriptions of the various pieces of apparatus and of methods of using them are rendered very clear. The major portion of the book is devoted to methods and formulæ, &c., the remainder affording a scheme for the study of certain pathogenic and other organisms. The last-named is very complete, and we are glad to see that the author has adopted Chester's suggestions for descriptive purposes. Hollow-ground slides for hanging-drop cultures are altogether condemned, but in our opinion they are most convenient. The directions for the preparation of tissues and for section-cutting might with advantage have been given at greater length, and the index might also have been somewhat fuller.

*An Introduction to the Bacteriological Examination of Water.* By W. H. HORROCKS, M.B., B.Sc., Assistant Professor of Hygiene in the Army Medical School, Netley, &c. London: J. and A. Churchill. 1901. Pp. 300. Price 10s. 6d.

A LARGE amount of information is contained in this book, but as an authoritative work on the bacteriological examination of water it is disappointing. For example, the preparation of media and their proper reaction for purposes of water-analysis are dismissed in half-a-dozen pages, while the agglutinative action of sera on the typhoid-bacillus occupies 18 pages; the scheme suggested (p. 282) for an analysis is very incomplete, and the significance of the Bacillus coli in water is discussed in less than five pages, part of which is devoted to a description of the cultural characters of the organism. For the preparation of water-plates the method of running-in the water into the tubes of melted media is given, whereas it is far preferable to run the water into the Petri dishes direct. The descriptions of the various organisms met with in water are good and useful, and the plates illustrating the colonies are excellent.

*Atlas and Principles of Bacteriology.* By Professor K. B. LEHMANN and Dr. R. D. NEUMANN. Translated from 2nd enlarged and revised German edition. Edited by G. H. WEAVER, M.D., Assistant Professor of Pathology at Rush Medical College, Chicago. Vol. I. Atlas: Vol. II. Text, pp. 500 and 600, with coloured figures. London and Philadelphia: W. B. Saunders and Co. 1901.

THIS work is likely to be of the greatest value in the laboratory and for the professed bacteriologist. It deals with the systematic side of bacteriology especially, and the descriptions of organisms and the references to synonyms, &c. are very full and complete. No one who attempts to identify the bacteria which he isolates can do without this book.

*Traité de Bactériologie pure et appliquée à la Médecine et à la Hygiène.* Par MM. P. MIQUEL et R. CAMBIER, Directeur et Sous-Directeur du Laboratoire de Bactériologie de la Ville de Paris. Paris: C. Naud. 1902.

THIS huge volume of over 1,000 pages bears witness to the growth of the science of bacteriology, and to the energy and activity of its votaries. The book is profusely illustrated with excellent figures and is well printed on good paper; in fact it is more like an *Edition de Luxe* than a working text-book. The authors would have been wise to have reduced the spacing, &c., so that it might have been compressed into more manageable dimensions. An enormous amount of information has been collected, and the work is a valuable one for reference. Methods occupy the first 236 pages, while the next 230 deal with pathogenic microörganisms including the question of immunity. We consider this portion to be the weakest of all, immunity for instance, being discussed in five pages, and no reference being made to Ehrlich's theories. The remainder of the work, which is devoted to fermentations and the application of bacteriology to hygiene, is much fuller, but even here such an important subject as the qualitative analysis of water is very inadequately dealt with. On the whole the book as an authoritative and exhaustive work on bacteriology is disappointing.

*The Mycology of the Mouth: A Text-Book of Oral Bacteria.* By KENNETH WELDON GOADBY, D.P.H. Cantab., L.R.C.P., M.R.C.S., L.D.S. Eng. London: Longmans, Green & Co. 1902. 8s. 6d.

THE author claims in his preface that an attempt is made for the first time to produce a practical text-book dealing with bacteria of the mouth, and in our judgment the book justifies the claim. Written primarily for students, the first five chapters, occupying some 70 pages, are devoted to an introduction to the methods, materials, and apparatus used in a bacteriological laboratory; while an appendix gives useful instruction on the management of the microscope, and explains and illustrates terms used in descriptions of bacteriological cultures. The author rightly pleads for the standardisation of bacteriological records, to enable an observer to confirm or disprove a statement by exact reproduction of the original experiments. With this object careful details are given of the preparation of media in general use, and an excellent chart for recording observations. Chapter VI. is a well-considered *resumé* of susceptibility and immunity. The remainder of the book, some 130 pages, is devoted to a description of bacteria found in the mouth, and to diseases special to that cavity. Among pathogenic bacteria of this region the author mentions B. diphtheriæ as found frequently, and in a fully virulent condition, in individuals who exhibit no clinical or pathological signs of the disease. B. influenzæ and B. tuberculosis are also mentioned in the same category.

The chapters on Dental Caries and Pyorrhœa Alveolaris are of especial interest. The author is an expert bacteriologist and a careful clinician; and the value of such a combination is abundantly shown in his treatment of these subjects. From broth-cultures the author has obtained enzymes capable of liquefying decalcified dentine; but hard undecalcified dentine was not attacked. Many organisms are mentioned as found in dental caries, but to no one alone is the disease specifically due. Similarly, in discussing pyorrhœa alveolaris, several organisms are enumerated, and the suggestion is made that the particular bacteria concerned in the process produce some sort of toxine, which so alters the vitality of the tissues surrounding the teeth that any and every mouth-organism may assist in the

continuation of the process. On page 76 it is noteworthy that the names of Gruber and Durham are associated with the "agglutination" reaction.

The whole book is clearly and concisely written, and in no part redundant. If any fault is to be found it is that the style in places recalls the language of laboratory demonstration; while in a book for students such terms as "binary fission" and "normal sodium hydrate solution" need explanation. The illustrations, eighty-two in number, are ample and well reproduced. The book should be welcomed not only by dentists, but by all interested in the hygiene of the mouth.

*Bacteriology*. Catechism Series. Pp. 96. 8vo. Edinburgh: E. and S. Livingstone. 1s.

MESSRS. LIVINGSTONE'S Catechism Series is familiar to most medical students. The present little volume will no doubt prove valuable in facilitating a rapid revision of the elements of bacteriology for purposes of examination, but it cannot in any sense replace the careful reading of a recognised text-book in this important branch of medical study. Apart from the serious objection which applies to all such "aids," that they tend to encourage superficiality and "cramming" to the neglect of systematic work, the book is creditable to its author. It is clearly written and concise, and on the whole is up to date and accurate. The sections on Diphtheria, Tetanus, and Typhoid are especially good; though as regards Widal's reaction in typhoid fever, a positive result with a dilution of 1 to 40 would not be accepted as sufficiently conclusive in a doubtful case. The paragraph on the Diplococcus intra-cellularis meningitidis is very meagre, and we are surprised to find no reference to micrococcus of rheumatic fever. With regard to Tuberculosis, the statement that the bacillus can be diagnosed by a microscopical examination alone is certainly misleading. The sections on Malaria and Filariaris are fairly full, but the principle on which the worms described have been selected is not quite evident. On the whole we consider that the book is satisfactory for the particular purpose for which it appears to be intended, though an index would have been a useful adjunct.

*Diseases of the Skin.—An Outline of the Principles and Practice of Dermatology.* By MALCOLM MORRIS, Consulting Physician to the Skin Department, St. Mary's Hospital, London, &c. With two coloured plates and fifty-eight plain figures. London: Cassell and Co. 1903. Price 10s. 6d., nett.

MR. MORRIS'S "Diseases of the Skin" is probably the best-known text-book on the subject for students in this country, and a new edition will be welcome to many. We congratulate the author on having successfully resisted the temptation to convert his little volume into a more bulky treatise—a proceeding which has rendered many students' manuals too large and costly for the purpose for which they are nominally designed. This convenient and portable little handbook contains an immense amount of information compressed into a small space. It should be of use, not only to students, but also to practitioners of medicine, owing to the large number of formulæ which it contains for the treatment of skin-diseases. The index is very full in respect to methods of treatment, and materially assists in looking up points in doubt. The book is lavishly illustrated.

*Les Médicaments.* By Dr. ALFRED MARTINET. Pp. 284. Paris: C. Naud. 1903. Price 4 fr.

THIS useful volume deals with the commoner and more important drugs, such as arsenic, digitalis, mercury, bromides, opium, quinine and salicylates, giving the most effective preparations of each, with advice as to prescribing it and the conditions in which it is indicated. The book is a very practical and commendable one, from which no medical reader can fail to pick up useful hints.

*Photothérapie et Photobiologie.* Rôle Thérapeutique et Rôle Biologique de la Lumière. By Drs. LEREDDE and PAUTRIER. Pp. 267. Paris: C. Naud. 1903. Price 4 fr.

MUCH attention has been directed to the action of light on the human body and its various tissues in recent years, and we find in the book before us an interesting account of all that is known of the physiological effects of the different

portions of the spectrum upon various animals and plants. The methods of applying light therapeutically are described, and the use of it in different affections is discussed. A preface by Professor Finsen expresses his high opinion of the book, along with his hope that its concluding chapter will act as a corrective of the exaggerated ideas and fantastic applications of "phototherapy," which he sees with regret.

*The Scottish Medical and Surgical Journal.* Edited by NORMAN WALKER, M.D., F.R.C.P. Edin., and HAROLD J. STILES, M.B., F.R.C.S. Edin. Vol. XI. 1902, July to December. With 10 plates and 29 figures and charts in the text. Edinburgh: The Scottish Medical and Surgical Journal, Ltd.

THIS last volume of the above journal contains many papers of considerable interest. Among them we may mention one by Dr. R. A. Fleming on "The Peripheral Theory of Nerve-Regeneration," two on Pyelitis of Infants by Drs. James Ritchie and John Thomson respectively, and one by Dr. F. Gardiner on the use of X-rays in the diagnosis of Phthisis. Interspersed among these and other papers of value are many interesting editorial comments, reviews of recent literature, and notices of books. A vigorous attack is made by an anonymous writer on the present state of medical education in Scotland, but the assailed curriculum, like "Aunt Sally," remains unlovely, but little affected by the missiles directed against it from many sides.

## BOOKS IN BRIEF.

WE have received several little books dealing with foreign resorts and questions of travel. We may mention first a useful little volume by Mr. E. A. Reynolds-Ball, F.R.G.S., giving excellent practical advice to those who intend travelling in the Near East [1]—Morocco, Egypt, Palestine, &c. Among other things it contains some hints, which should be useful to the inexperienced, as to precautions to be taken and deviations from occidental modes of life necessary in tropical and sub-tropical countries. "The Health Resorts Bureau" send us pamphlets dealing with the advantages of Contrexéville and Carlsbad for the treatment of various diseases.

A thoroughly scientific treatise on the subject of climatology [2] is published by Messrs. Macmillan & Co., being a translation of Professor's Hann's exhaustive work on the subject. The first part of the English edition is devoted to purely theoretical considerations of the relations prevailing in regard to physical conditions, such as rainfall, winds, &c., in different parts of the world. The book when completed will form a valuable work of reference, and a trustworthy guide in the selection of health-resorts suitable for various maladies.

A guide book to the health-resorts and institutions for patients throughout Great Britain [3] has been issued by the Association of Medical Men receiving resident patients. It gives not only the names of the members of the association, but also convalescent homes, homes for the blind, for mentally defective children, and for epileptics, sanatoria, nursing homes, &c. It should prove a useful source of information in the many cases in which advice is sought as to such institutions.

Another handbook on somewhat the same lines gives

[1] *Practical Hints for Travellers in the Near East.* By E. A. Reynolds-Ball, F.R.G.S. Cr. 8vo., pp. 140. London: E. Marlborough & Co. 1903. Price 2s. 6d.

[2] *Handbook of Climatology.* By Dr. Julius Hann, Professor of Cosmical Physics in the University of Vienna. Translated by R. de Courcy Ward, Assistant Professor of Climatology in Harvard University. Vol. I.: General Climatology. pp. 437. New York: The Macmillan Co. 1903. Price 12s. 6d. nett.

[3] *Where Shall I Send My Patient?* A Guide for Medical Practitioners, &c. Printed for the Association of Medical Men receiving Resident Patients. By E. J. Frampton, Bournemouth 1903.

popular account of the history and of the *rationale* of the open-air treatment of phthisis, together with a list of the principal sanatoria at present ready for the reception of patients.[1] The list is not apparently complete, as we miss, for example, the East Anglian Sanatorium, near Colchester. The book should be of use to those who are looking out for a suitable place to which to send patients suffering from tuberculosis. It is copiously illustrated with views of the different sanatoria; and examples of the rules in force in some of them are given, as an indication of the sort of daily routine which patients are expected to observe.

The conditions under which surgical operations are performed in private houses[2] must at times be a source of considerable difficulty to both surgeon and nurse. Some useful directions, affording guidance for nurses, are contained in a little brochure written for the Nurses' Coöperation by Mr. C. S. Wallace, detailing the various measures necessary for preparing instruments, &c. To insist on as careful a toilet of the skin before giving a hypodermic injection as before an operation is perhaps a counsel of perfection, but no harm can result from carrying it out when time permits.

Some useful little cards are published by Mr. H. K. Lewis, containing a short account of the principal disinfectants,[3] with the methods of using them. Advice is given as to disinfecting rooms, cabs, linen, sputum, &c., along with general directions as to the measures to be carried out in the presence of an outbreak of infectious disease. The cards take practically no room in the pocket, and might, with advantage, be given to heads of families in which infection has occurred.

Some sensible advice to mothers on the feeding and hygiene

[1] *A Handbook of the Open-Air Treatment and Life in an Open-Air Sanatorium.* Second edition. 9th thousand. By Dr. Charles Reinhardt, Physician, Hailey Open-Air Sanatorium, &c.; and Dr. David Thomson, Senior Resident Physician, Stourfield Park Sanatorium, Bournemouth. 1902. London: John Bale, Sons, and Danielson.

[2] *Preparations for Operations in Private Houses.* Written for the Nurses' Coöperation by Cuthbert S. Wallace, M.B., B.S., F.R.C.S., Assistant Surgeon to St. Thomas's Hospital, &c. Henry J. Glaisher. Price 1s. nett.

[3] *Disinfectants and Antiseptics.* How to use them. By Edward T. Wilson, M.B. (Oxon.), F.R.C.P. (Lond.), Physician to the Cheltenham General Hospital, &c. Fortieth thousand. London: H. K. Lewis. 4 pp. Price 1s. per dozen.

of infants,[1] calculated to guard against the incidence of summer diarrhœa and similar ailments, is to be found in a leaflet by Dr. Nash of Southend, suitable for distribution by district visitors or others interested in the needs of the poor and ill-informed.

A useful book, which should be placed in the hands of all young women who are about to undertake the responsibilities of marriage, is published under the name of *The Four Epochs of a Woman's Life.*[2] It gives in a clear and sensible manner the information which has in many cases to be acquired in a haphazard way by bitter experience. The introduction contains excellent advice on the up-bringing of girls, though we cannot agree that a child should not take dancing lessons before eight years old. Movement is natural to a child, and to make it rhythmic and orderly has a certain educational value. The four epochs are puberty, marriage, maternity, and the menopause; and under each of these headings good and carefully-considered advice is given. Occasionally the author errs rather on the side of not recommending consultation with a doctor, *e.g.*, when during pregnancy there is pain and swelling of the lower limbs and external genitals, a recumbent position and "inunction of the skin with cotton-seed or cocoa-nut oil" only is advised, and no hint given of the possibility that these may be signs of a more serious condition. The chapter on the new-born infant is especially good, as also is that on the menopause; and if all women who are approaching that critical time would read it, they would be spared much of the groundless fear and anxiety from which many suffer so needlessly. There is a complete glossary of all the technical terms used in the book, which makes it still more valuable to those whom it is intended to help.

[1] *Simple Rules for Preventing Infantile Complaints and Deaths among Infants.* By J. T. C. Nash, M.D., D.P.H., Medical Officer of Health for Southend-on-Sea. Bristol: John Wright & Co. London: Simpkin, Marshall, Hamilton, Kent, and Co. Price 1d. each, or 8d. per dozen.

[2] *The Four Epochs of a Woman's Life: A Study in Hygiene.* By Anna M. Galbraith, M.D. With an introductory note by John H. Musser, M.D. London and Philadelphia: W. B. Saunders & Co. 1903. Price 5s. nett.

# Notes by the Way.

**To Our Readers.**

We take the present opportunity of calling the attention of those of our readers who are in general practice to the fact that we are very glad to welcome papers on medical topics, reports of interesting cases, or accounts of their experience of the action of remedies, from all members of the profession. It is not by any means only in hospital and consulting practice that cases of interest are met with, and those who have looked through previous numbers of THE PRACTITIONER will have seen that under the heading of "A Case with Comments" we have initiated a series of reports of single cases which presented special features, without confining ourselves to what may be termed set articles on large subjects, with copious references to the literature of other countries which can only be collected by those who have access to well-furnished libraries. While recognising the difficulty which is met with in private practice in making accounts of cases complete, owing to the rarity with which necropsies are obtained, we yet feel strongly that much valuable material is lost by neglect to record exceptional cases, and appeal to our readers to make their experiences of value to others by recording them.

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**A Cod-liver Oil Famine.**

It is impossible not to feel some concern at the condition of things now prevailing with regard to so important an article of the Materia Medica as cod-liver oil. Owing to the failure of the fishery on the coast of Norway the price of the best oil has risen to an alarming extent—a gallon of it now fetching a price of more than 25s., whereas a year ago it was worth about 5s. or even less. Several of the London hospitals, if we are correctly informed, now decline to supply their patients with this medicine at all, and we hear rumours of inferior

substitutes such as shark-oil being employed in place of that derived from the cod. Considering the admitted value of the true oil in the treatment of phthisis and other forms of tuberculosis, and in many of the diseases of children, the present scarcity may be looked upon as a veritable medical calamity. It is to be hoped that the fish may next season return to their accustomed haunts. The habits of fish are but little understood, and we are quite in the dark as to the probable causes of such a change of habitat as has been seen in the cases of the cod and of the sardine, so that it is impossible to feel very confident as to their future movements.

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**Archives of Neurology.**

THE second volume of *Archives of Neurology*, edited by Dr. F. W. Mott, F.R.S., of which we publish a review elsewhere (p. 846), contains in its preface many interesting and suggestive remarks throwing light on the close relationship which exists between insanity and other factors in our social life. Two great influences for evil are forcibly insisted on by Dr. Mott, viz., alcohol and syphilis. The views of this eminent authority on nervous diseases with regard to the relationship between syphilis and the closely-connected maladies known as Tabes dorsalis and General Paralysis of the Insane are well known to all students of the subject. They may be summed up in the words "No syphilis, no general paralysis or locomotor ataxy." With regard to alcohol Dr. Mott writes: "Of the influence of alcohol in the production of insanity, and in the acceleration of all the devitalising processes there can be no question." Other factors in the causation of insanity are the stress connected with the hurry and overpressure of modern life, and as a remedy for this, Dr. Mott suggests that the better housing of the labouring classes and the provision of old-age pensions as is done in Germany might have a beneficial effect on the statistics of mental disease in this country. It would be interesting to know if any decrease in the ratio of insanity to the population has really taken place in Germany as a result of this legislation.

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**Treatment of early stages of Insanity in the General Hospitals.**

THE question of the advisability of taking cases of mild or incipient insanity into the wards of general hospitals has been already discussed in our pages by Dr. Campbell Thomson,[1] and it is alluded to by Dr. Mott in his *Archives*. The latter is in favour of such treatment, and it may be upheld on several grounds. In the first place there are many cases in which it is for a time doubtful whether the patient is suffering from some organic disease of the brain or from the so-called functional conditions which are generally classed as insanity. The former are undoubtedly proper cases as a rule for hospital, as opposed to asylum, treatment. Even among cases usually classed as insane there are some who are so comparatively slightly deranged that they could well be treated in the general hospitals without having to undergo the stigma of being put into an asylum. There would often be much less difficulty in inducing a patient still in the early and curable stages, or one so slightly affected that there would be reason to hesitate with regard to "signing him up," to come into hospital, than in sending him to an asylum; and by this means he might receive the benefit of skilled treatment at a critical stage. The benefit to students of medicine of such experience of early mental cases would be very considerable, as they are a well-recognised cause of difficulty in actual practice.

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**Prevention of Venereal Disease.**

IT seems almost hopeless to expect any steps to be taken in this country for the prevention of those contagious diseases which are called venereal, and yet there can be little doubt that the problem is one of the gravest which can be imagined. The enormous amount of suffering which is caused by these maladies cannot be conceived by any but medical men, who alone are taught to recognise the innumerable cases of hopeless paralysis, of blindness, of insanity and idiocy, and of actual premature death which are directly traceable to syphilis and gonorrhœa. Nor is it only on the individuals who are directly infected by their own action—the "guilty" persons of the moralists—that the punishment falls, but innocent men, women, and children

[1] THE PRACTITIONER, March 1903, p. 385.

are maimed or blinded for life through no fault of their own. Why is it that no attempt is made to deal with this truly fearful condition of things? The reasons are mainly two. The first is the feeling that these subjects are unclean,—that they are carefully to be kept out of sight by all respectable people,—that it is almost indecent even to admit a knowledge of their existence. It is a part of that British "hypocrisy" and Pharisaism which is so often ridiculed by observers of other nations. The second reason is due partly to our form of government—to the fact that a small number of noisy persons can exercise an influence on the Government altogether disproportionate to their real importance. Such a noisy minority of moral (?) enthusiasts raised, and will always raise, the outcry that any attempt to prevent venereal disease amounts to the encouragement of vice; and this ignorant and fanatical outcry has inflicted, and continues to inflict, on thousands of innocent victims sufferings of which the respectable and easily-led public have no conception, and for which, therefore, they have no pity. In the army the amount of invaliding due to this cause is a serious diminution in the actual fighting strength of the country; and yet amid all the calls for efficiency no voice seems to be raised in favour of protecting those who are, in the interest of the State, prevented from marrying from diseases to which they are thus—human nature being what it is—predestined as victims. The control of other infective diseases is undertaken by the State, yet our soldiers, its special servants, are now deprived even of the slight protection afforded in the past by the Contagious Diseases Acts. Those who succeeded in procuring the repeal of these Acts have on their shoulders the burden of guilt for having inflicted on thousands of their fellow creatures a heritage of suffering due to sins for which they are in no respect guilty.

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**The London County Asylums Laboratory.**

THE suggestion is made by Dr. Mott that it might be of advantage to remove the laboratory over which he presides, and which is at present situated at Claybury in Essex, to London in order to render more generally available the facilities which it offers for research. There can be no doubt that a more central position for this important institution

is much to be desired. The opportunities which it affords for the study of neuro-pathology are unrivalled in this country, and there would be no lack of willing workers to profit by them and by the guidance of its distinguished director if it were more suitably placed for general use. Now that the London County Council have seen how fully their enlightened policy of appointing a pathologist has been justified by its results, we cannot doubt that they will be willing to face the expense necessary for establishing their laboratory in London. Such an institution, worked in connection with the University of London, if the latter at length succeeds in making itself a living and moving force in the direction of scientific education, would constitute a centre for very important work on nervous and mental diseases, the material results of which would well repay the preliminary outlay.

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**Two Books on Alcoholism.**

Now that the question of reducing the amount of drunkenness in the country by closing some of the public houses at which drink may be procured is so much in the air, it is interesting to remember the negative view as to the value of "temperance legislation" put forward by Dr. Archdall Reid as the result of a scientific study of the causes and effects of alcoholic indulgence. This writer comes to the conclusion that alcohol is one of the great factors in producing that elimination of the unfit which is the most potent element in the evolution of the race. It is therefore a blessing in disguise. The only way in which a sober people can be produced is by allowing natural laws to have free play, those who have a craving for excessive indulgence in alcohol being gradually exterminated by their own vice. It is probable that there is a great deal of truth in this view, but we cannot expect it to commend itself to those who are anxious to save their fellow creatures from the results of their want of self-control, and to deal with the mass of suffering which they actually see around them. The problem of the treatment of the habitual drunkard is earnestly handled, though under the form of fiction, by Dr. W. L. Howard, in his novel, *The Perverts*. We cannot say that we think the subject quite suited to this form of treatment, and certainly the story which he has written as the vehicle of his moral is

not entirely pleasant reading. Still, we are in full sympathy with his main conclusion, that the drink-craving amounts in many cases to actual insanity, and that it would be well for this fact to be legally recognised, so that it might be made possible to confine a confirmed drunkard in an institution against his will, for his own reformation and for the protection of his relatives from the results of his failing. It is much to be hoped that such forcible detention will be made legal in this country in the case of confirmed alcoholics—a much more humane course than that of treating them as responsible members of society and inflicting on them a number of short terms of imprisonment for their recurring offences against order and decorum. To suppose that these unhappy individuals have the will-power to resist their besetting vice, and are to be punished for succumbing to a temptation which in reality they cannot hope to resist, is not only scientifically indefensible, but is morally cruel.

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**Compulsory Detention of Habitual Inebriates.**

SOME valuable evidence as to the laws existing in different countries as to compulsory detention of inebriates has been collected and published in the form of a blue-book by Dr. Branthwaite,[1] who may be congratulated on the important contributions which he has made to the study of the problems connected with the treatment of alcoholism. In the present supplement he points out that in a large number of countries it is now possible to confine an habitual drunkard against his own will in a reformatory of some kind for the cure of his malady and the protection of his relatives and his property. In the United States, the States of Massachusetts, Delaware, and Connecticut possess legal enactments in this direction; and among our own Colonies—New South Wales, Victoria, Queensland, Tasmania, South Australia, and New Zealand are similarly provided. It is high time that our own country took steps in the same direction.

[1] *A Collection of British, Colonial, and Foreign Statutes relating to the Penal and Reformatory Treatment of Habitual Inebriates*, being a Supplement to the Report of the Inspector under the Inebriates Acts for the year 1901. London: Eyre and Spottiswoode, 1902. Price 1s. 5d.

# Novelties and Notices.

### GLYCO-HEROIN.

Of the many drugs which the enterprise of the manufacturing chemist puts before the medical profession few are found to stand the test of experience. Among those which have gained a footing, and bid fair to maintain it, one of the most notable is heroin, a derivative of morphine, which is said to be free from some of the objections to the parent drug. It is a valuable sedative in cases of irritation of the air-passages, and may be used in some conditions in which morphine is contraindicated, as in some forms of bronchitis. Glyco-heroin (Smith) is a thick syrupy fluid, of the consistency of a linctus, containing $\frac{1}{16}$th grain of heroin in each teaspoonful. It has an agreeable taste, and should prove a convenient way of administering the drug. It is well worth a trial in cases of irritable cough, especially those forms which occur at night and cause distressing sleeplessness. It is manufactured by Messrs. Martin H. Smith and Co., of New York, the British agents being Messrs. Thomas Christy and Co., Old Swan Lane, Upper Thames Street, E.C.

### VALENTINE'S MEAT-JUICE.

It is unnecessary to say anything in commendation of Messrs. Valentine's well-known preparation, which has established a firm footing as a food for the sick. It differs from the majority of meat-extracts in that it contains a large proportion of albuminous material which makes it of value as a true food as well as a stimulant. It is readily assimilated even by weak stomachs, and may be retained in cases in which all other food is rejected.

### JEYES' SPECIAL FLUID.

This is a coal-tar product introduced by Jeyes' Sanitary Compounds Co., Ltd., 64, Cannon Street, E.C. Very satisfactory experiments are stated to have been carried out with it by Dr. Klein, F.R.S., showing it to possess a high bactericidal power. It would appear to be a good antiseptic for disinfecting

the sputum of tubercular patients, and may be used for all ordinary household disinfecting purposes.

### HAZELINE.

The properties of Hamamelis as a styptic have long been known, and the special preparation called Hazeline made from it by Messrs. Burroughs, Wellcome and Co. has established itself as a convenient form of the drug, containing the active principle in a concentrated state. It is a useful application in hæmorrhoids, &c., and may also be used as a toilet preparation for chaps and roughness of the skin. Being a colourless fluid it does not stain linen or other materials with which it may come in contact.

### MARMITE.

This is a vegetable extract closely resembling in appearance and taste the solid extracts of meat which are well known. A teaspoonful of it in a cupful of hot water makes a pleasant "cup" suitable for invalids, possessing an agreeable flavour of vegetables, and constituting a change from the ordinary diet of the sick-room. It should also prove a valuable adjunct in the kitchen as a flavouring agent for soups, &c. Analysis shows it to be rich in soluble albuminoids and nitrogenous bases, while it is free from certain alkaloids derived from meat which are undesirable constituents of some animal extracts. It is manufactured by the Marmite Food Extract Co., Ltd., 40, Mincing Lane, E.C., who were awarded a gold medal for this preparation at the recent Cookery and Food Exhibition at the Albert Hall.

# EVERYDAY AILMENTS AND THEIR TREATMENT.

## SYMPTOMATIC TREATMENT OF PHTHISIS.

ALTHOUGH it is well recognised at the present time that the true and radical treatment of pulmonary tuberculosis consists in what is known as the open-air method, combined with the administration of ample quantities of nourishing food, yet there remain unfortunately a large number of cases in which it is impossible to adopt this treatment, either owing to the patient's lack of means or for some other reason. In these cases it is still necessary to be content with palliative measures, calculated to relieve the symptoms of the disease rather than to effect a radical cure. Much may thus be done for the comfort of the patient in many directions.

The principal symptoms of which we shall here speak are the cough, the night-sweats, the occasional pains in the chest, digestive disturbances, and the hæmoptysis. In treating the *cough* we have to bear in mind that it is to some extent a salutary feature, in that it tends to expel from the lungs a certain number of the bacilli as well as the morbid products of their action. It must therefore be to a certain degree encouraged, and not altogether checked. In the daytime the cough does not do any harm to the patient except in those cases in which it is unusually distressing and exhausting. It need not, therefore, be specially treated in the majority of instances except at night. Sedatives may then be employed. A useful linctus for this purpose may be composed of Liquor Morphinæ, m. iii.; Vinum Ipecacuanhæ, m. v.; Oxymel Scillæ, m. xv., and Theriacum (treacle) to one drachm.; or the recently-introduced derivative of morphine, Heroin, may be used instead of the Liquor Morphinæ in doses of $\frac{1}{16}$ gr., or less to start with. In many cases the cough is liable to be troublesome in the early morning, waking the patient up in the small hours and causing much distress and exhaustion. Much may be done in such instances by the administration of some warm drink, such as hot milk or cocoa. This causes a loosening of the mucus which clogs the air-passages, and facilitates its expulsion, this being often followed by a period of rest and

cessation of the cough. During the daytime the use of an oro-nasal inhaler charged with some antiseptic solution may be employed, with the effect of encouraging the cough at first, and later on, to some extent, checking it. It also may, perhaps, act as a disinfectant to the air-passages. The fluid employed may consist of equal parts of Oil of Eucalyptus, Spirit of Menthol, and Spirit of Chloroform, 20 to 30 drops on the respirator being inhaled three or more times a day for half an hour or more.

For the *night-sweats* much may be done in many cases without having recourse to drugs. Many patients are much benefited in this respect by the use of a "night-cap" of cold milk containing a little brandy or rum, taken at bed-time. Others are relieved by tepid sponging at night with water or vinegar-and-water. If these means are ineffectual, the usual zinc-and-belladonna pill is very useful, consisting of two to four grains of Oxide of Zinc with ¼ to ½ of a grain of Extract of Belladonna, taken at bedtime; or a hypodermic injection of atropine may be used, one minim of the Liquor Atropinæ Sulphatis being given, or a tablet of $\frac{1}{100}$ gr. of the salt.

Patients complain at times of considerable *pain* of a wandering nature in different regions of the chest in the course of phthisis. These pains are probably due to slight attacks of pleurisy showing the gradual advance of the disease. A simple stimulating liniment, such as the Turpentine and Acetic Acid Liniment of the Pharmacopœia, is often successful in giving some relief, and its use may benefit the cough as in ordinary bronchitis. If it does not, painting the affected area with iodine—using the tincture or equal parts of the tincture of the liniment of iodine, as the latter is too strong as a rule—will generally prove efficacious.

The management of *digestive derangements* is a matter of considerable importance as it is necessary to administer to these patients an increased quantity of nourishment in some form or other. The continued use of a stomachic mixture, such as gentian and soda, with or without a few minims of tincture of nux vomica, is of the greatest assistance in improving the appetite and avoiding indigestion. If the latter do occur, it must be treated on general principles, by reducing the diet, and especially cutting down the fatty materials which

are usually insisted on in these cases. Rest in bed is often advisable, and a mixture of bismuth and soda may prove serviceable. It is important to attend to the bowels in these cases, a dose of calomel followed by a Seidlitz powder being often a useful remedy. If the act of taking food is liable to excite paroxysmal cough, followed by retching and vomiting, counter-irritation to the epigastrium, as recommended by Dr. Mitchell Bruce in his book on "The Principles of Treatment," may be tried, or a spray of cocaine may be applied to the pharynx and larynx just before meals.

The *diarrhœa* which is met with in the course of phthisis may be due simply to overfeeding, or to organic lesions of the alimentary tract, such as tubercular ulceration or amyloid (lardaceous) disease. In the former instance attention to the diet will serve to relieve the intestinal catarrh, fatty foods being temporarily withheld, and, if necessary, milk-diet resorted to for a period. For the organic conditions it is unfortunately impossible in most cases to do much. A starch-and-opium enema may be of use, or the administration of morphine by the mouth as in the formula—℞. Plumbi Subacetatis, gr. ii.; Liquoris Morphinæ, m. v.–x.; Acidi Acetici Diluti, m. x.; Aquam Chloroformi ad unciam. Misce, fiat haustus, ter die sumendus. Or a mixture containing Salicylate of Bismuth, gr. xx.; Bicarbonate of Soda, gr. xv., with mucilage and peppermint-water may be substituted, to which 10 minims of the Liquor Morphinæ may be added if necessary.

With regard to *hæmoptysis* it cannot be too strongly insisted on that an attack of blood-spitting in a young person is almost certainly due to tubercular diseases of the lung, even if no physical signs of the condition can be made out. If this be realised, such an attack may be of the greatest service to the patient by calling attention to the existence of disease, which might otherwise remain latent till it had gained so firm a foothold as to be much more rebellious to treatment. If hæmoptysis has taken place, the first thing to be done is to reassure the frightened patient as to the existence of immediate danger to life. This may generally be given with a clear conscience as the cases of immediately-fatal hæmoptysis are very rare indeed. Encouragement may be aided by the administration of a hypodermic injection of morphine (gr. $\frac{1}{8}$–$\frac{1}{4}$), which

quiets the patient and soothes the excited action of the heart, thus directly tending to stop the bleeding. The subject of blood-spitting should be kept completely at rest for some hours if possible after the occurrence, not even being carried to a different room to be put to bed. If he has been already placed in bed, he must be persuaded to lie perfectly quiet, not speaking to anyone, or even turning in bed. Food is best withheld for six or eight hours, after which it should at first consist of milk only, given cold or even iced. If thirst is great, a little ice may be sucked at the commencement of the treatment and throughout. Drugs other than morphine are of little use, as they cannot reach the bleeding point. The use of ergot in any form is not to be recommended, as its action is to constrict the terminal arterioles and thus to raise the blood-pressure throughout the body, while the injured vessel being torn cannot contract. Tincture of Hamamelis may perhaps be of some service, and at any rate it can do no harm, or the preparation known as Hazeline may be used in its place. Calcium chloride (gr. x–xx) may be given with a view to increasing the coagulability of the blood, or the newly-introduced Adrenalin chloride may be administered; but of the value of the latter in these cases we cannot speak from personal experience. Turpentine has also been highly spoken of as a hæmostatic; 30 minims may be given in Mistura Amygdalæ or mucilage, or a drachm of the drug may be inhaled on a respirator. Stimulants should hardly ever be given in cases of hæmoptysis, or indeed of any hæmorrhage; but if syncope occur it may be necessary to administer a teaspoonful or more of brandy. Its tendency is of course to increase the bleeding. The anæmia left after an attack of hæmoptysis must be treated on ordinary lines by the administration of iron in some form, care being taken not to upset the digestion in a patient whose recovery may depend largely on his power of taking food.

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